

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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EDITORIAL COMMENT.

Small Property Insurance.

Without question the announcement in Parliament, on Tuesday, of the Government's extension of the air-risks insurance scheme to cover the poor man's goods, will be welcomed throughout the country. Its introduction is but a tacit acknowledgment of what we originally advocated—that damage by aircraft should be a National liability and not a penalisation upon individual members of the community. Too late this view has since dawned upon a very large section of that community. Had action in this direction been taken a year or more ago when we started the idea, there is little doubt that, with the influential interests which have since been brought to back up the question on the same lines, all such damage would have been regarded as a natural item to debit to the general cost of the War. As we said a month or two ago, however, it is now hardly worth while re-opening this question, since the scheme as put into operation by the Govern-

ment appears to have met with instant success, and after all, any surplus revenue derived from the premiums will go directly to benefit the pockets of the taxpayers in relief of taxes in other directions. Undoubtedly the absence of any insurance policy being accepted under £100 was a blot upon the scheme. By the creation of the £25, £50 and £75 policies, this unfairness has been met, whilst the method of its administration through the Post Office is an admirable one. Most of the usual formalities of an ordinary policy are thus obviated, and we think that there is likely to be a very brisk business in these small coverings the moment the scheme is in working order. It must be remembered however slight, intrinsically, the value of the poor man's home may be, the bits and pieces which make up each household are to the individual person or family *home*, and there should be an atmosphere of greater rest from anxiety, with those seeking the benefit of these small policies, with the knowledge that destruction of their treasured household gods does not mean a fresh struggle to replace their loss.

In regard to the larger policies, a question has arisen in connection with the interpretation of the clauses of the Government policy, which is a formal printed document. It would appear from a correspondent to the *Times* that a house which was insured by him through a company under the Government scheme, was slightly damaged by enemy bombs and that the greater part of the claim was admitted. But the Government office declined to pay the balance because it related to the reinstatement of a small building in the same curtilage, though separate from the house, which was not separately insured in the policy. He states that he has reason to believe that the insurance company, which had already on its own account insured the property against ordinary fire risks, would have met the claim, although not legally liable, especially as the sum insured was sufficient to cover the small outbuilding as well as the main structure. The correspondent's suggestion is that in the light of this experience it certainly behoves property-owners to examine their policies and revise them if they have a separate structure not specially insured.

It is to be hoped that there are exceptional circumstances about this particular case, as by all-round mutual arrangements, competition amongst the companies for this aircraft business was tabooed, it being suggested by the Government that the public should arrange their policies through the same office where their fire risks were covered, and that the amount should be identical

because of the average clause. But surely if the public have fallen in with this admirable suggestion, it would be an obvious injustice if the same conditions as to out-buildings did not hold good, as in the fire insurance policy. Some official pronouncement should be made in this connection, or most disquieting feelings may arise with thousands of insurers who have innocently accepted the Government air risk policies as covering all that is covered by their fire risk policies, if attack happens to come from the air.

The Flying Services Fund.

With the publication last week of the Official Notes of the Royal Aero Club, the "figure of merit" of £10,000 was recorded for the subscription list of the Flying Services Fund which is administered by the Club. It was by the well-timed generosity of the City of London's new Lord Mayor, Sir Charles C. Wakefield, in sending a cheque for £63 2s., the exact amount required to bring the list to round figures, that this sum was reached, and it was a graceful act of Sir Charles, immediately prior to his taking up office, which presages well for his year of service at the Mansion House. Now that the five-figure total has been reached, we hope that fresh life will be given to this most estimable Fund which has not had the amount of support which it has a right to demand. Originally when the Fund was first inaugurated we had confidence that it would quickly reach the five-figure stage, and we ventured even to hope that it would soar to the six-figure height. We are now even more convinced that the latter is the nearer figure which *ought* to be attained, once the public only realise what is due to the aeronautical side of the work, which is being accomplished by the members of the British Flying Services, in this great war. Although the casualties amongst pilots have not been what most people anticipated, there are quite sufficient cases where the aid of the Flying Services Fund has been already enormously appreciated, to render it necessary that the Fund should be more generously supported in the future. All subscriptions go to help those who may need it, expenses of administration, &c., being borne by

the Royal Aero Club, greatly to its credit. We shall hope, therefore, to find that in the near future subscriptions will begin to flow in with a run until the sum total reached is more in keeping with what may be justly asked for a body of men which has given such a magnificent account of itself in its desire to serve the best and vital interests of the British Empire and those of our Allies. Do not be afraid of contributing small amounts. They all tell up, and there should be quite a nice lot of surplus profits available for helping, with a small proportion, so deserving a cause.

Pilots.

At the time when the Flying Services Fund has got past its bantling stage of £10,000, another total of significance is that of the number of pilot certificates which have been granted by the Royal Aero Club. This total, this week, reaches and has well passed its 2,000th mark, and the numbers presenting themselves weekly for the badge of efficiency are steadily on the increase, so that we may look forward to an ever-growing supply of pilots for the country's needs during the continuance of hostilities, and as a nucleus for the great flights of aeroplanes which, with the breaking out of peace, it will be the duty of the Government to at once set about bringing into being. Were the number of competent pilots in the Services to be taken into consideration on the top of the 2,000 officially certified, quite a respectable addition would, we believe, be seen. And in this connection we think it a pity that all who prove themselves proficient in piloting should not automatically take up their brevets. The time must come when the ranks of pilots will be enormously extended upon the broader lines of expansion advocated in "FLIGHT" months ago. It should be a *sine qua non*, therefore, that *all* should go through the official formula of being certified, so that each man may have with him a document which at once places him in a category of merit, one to be respected by those who have not so far distinguished themselves in like manner. Whether the proficient pilots be members of our Naval or of our Military forces, we should like to see their names duly added to the rôle.

THE ROLL OF HONOUR.

THE Secretary of the Admiralty has announced the following casualties:—

Under date November 7th:

Injured.

Flight-Lieutenant Harold F. Towler, R.N.
Flight Sub-Lieutenant Frank S. McGill, R.N.

The following casualties in the Expeditionary Force have been reported from General Headquarters:—

Undated:

Missing.

Second Lieutenant A. C. Collier, King's Own (R. Lancs Regt.), 9th Batt., and R.F.C.

Previously reported Missing, now reported Killed.

Lieutenant S. W. Caws, Royal Flying Corps.

Previously reported Missing, now reported Prisoners of War.

Second Lieutenant M. W. Greenhow, W. Yorks Regt. and R.F.C.
Captain T. W. Mulcahy-Morgan, R. Irish Fus. and R.F.C.

Wounded.

Sergeant F. Courtney and Sergeant G. Thornton.

Missing.

Second Lieutenant B. Walkin, Duke of Cornwall's L.I., attached R.F.C.

Previously reported Missing, now reported Prisoner of War.

Second Lieutenant H. B. Stubbs, Royal Flying Corps.

Previously reported Missing, now reported Killed.

Captain B. T. James, R.E., attached R.F.C.

The following casualties have been reported as caused by hostile aircraft:—

Killed.

R.F.A.—Gunner H. Absolum.

8th Howitzer Brigade Canadian Field Artillery.—Sergeant E. C. Harris and Gunner C. G. Peterkin.

5th Brigade Canadian Field Artillery.—Gunner E. W. Bayes, Driver C. Boeyckens, Driver T. Dickson, Gunner W. G. Harris, Gunner H. A. Horn, Lance-Corporal D. R. Johnston, Gunner S. G. Lane, Driver S. McKay, Bombardier D. J. Phillips, Gunner R. D. Simpson, and Gunner R. S. Truscott.

Died.

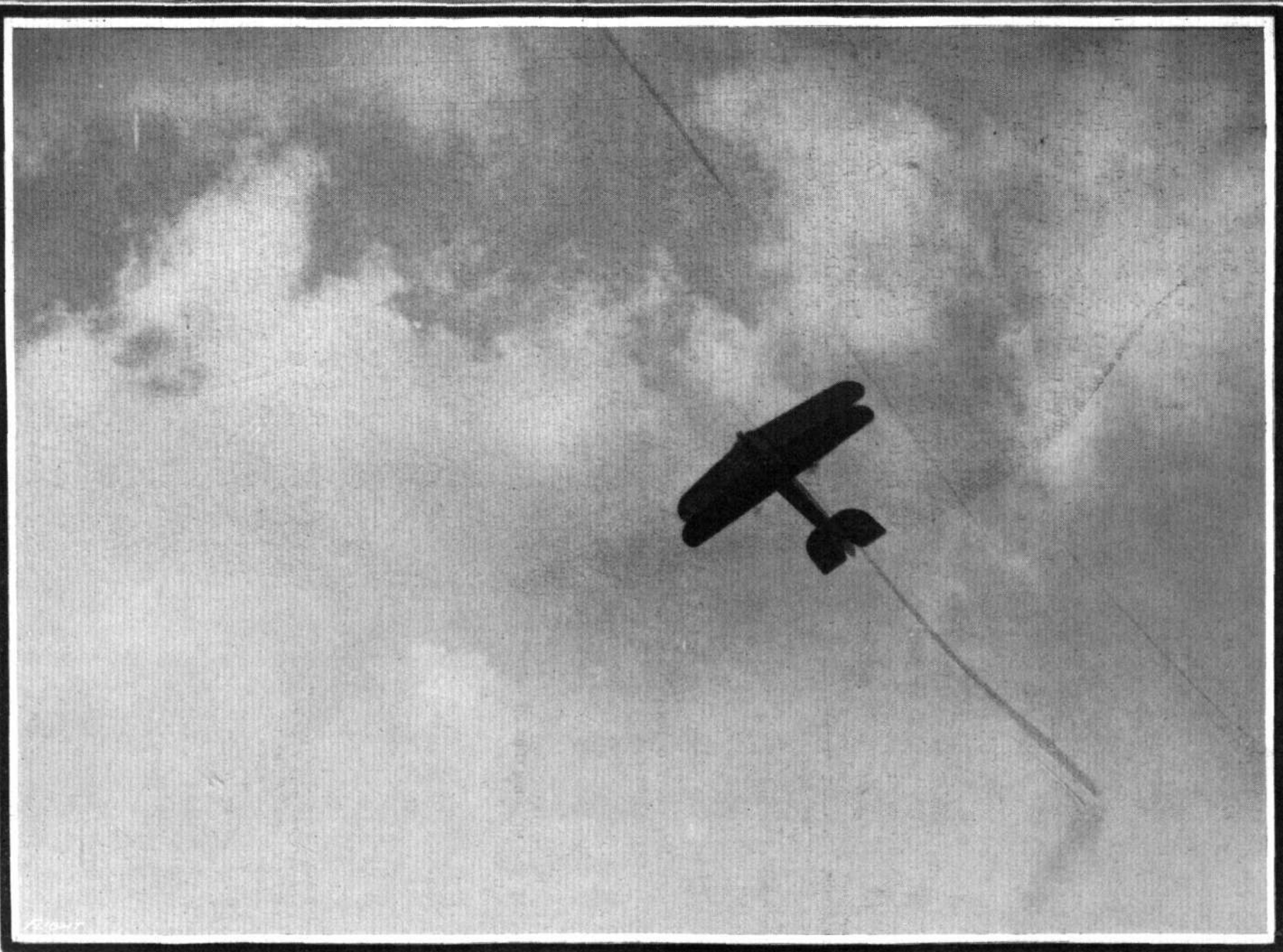
5th Brigade Canadian Field Artillery.—P. Borthwick and Gunner H. Rixon.

Wounded.

5th Brigade Canadian Field Artillery.—Gunner C. W. Chapman, Sergeant R. F. Eyre, Gunner H. Hooton, and Gunner R. Milligan.

NOVEMBER 12, 1915.

FLIGHT



ON THE UPWARD GRADE AT HENDON.—A view from beneath of the Mann biplane.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, Nov. 5th.

"YESTERDAY five air fights took place, resulting in a German aeroplane being brought down in our lines. Since November 1st, the weather has been very wet."

General Headquarters, Nov. 10th.

"On the 7th inst., our aeroplanes bombed some German hutments, apparently with good effect."

"As a result of a protracted air fight on the same day a German machine was overturned and fell inside the enemy's lines from a height of 7,000 ft."

"In another fight near Douai we lost an aeroplane."

French.

Paris, Nov. 5th. Afternoon.

"In Alsace one of our air squadrons flew over Dornach and bombarded the works used by the Germans for the manufacture of suffocating gases."

Paris, Nov. 7th. Afternoon.

"Enemy aeroplanes dropped eight bombs in the Dunkirk district. A child was injured. The material damage was unimportant."

Paris, Nov. 8th. Evening.

"To the north of St. Mihiel our batteries demolished a German anti-aircraft gun."

Russian.

Petrograd, Nov. 4th.

"The enemy dropped two bombs on the railway station of Klevan, north-west of Rovno."

Italian.

Rome, Nov. 3rd.

"Notwithstanding adverse atmospheric conditions, the raids of our aviators continue. Escaping the fire of numerous anti-aircraft guns, they effectively bombard the many camps, trenches, and railway stations."

Rome, Nov. 4th.

"On the night of the 2nd, during a storm, one of our dirigible balloons bombarded enemy encampments in the Gorizia Plain. The airship, which was discovered by

the light of star shells and searchlights, and was subjected to uninterrupted artillery fire, returned safe and sound."

Rome, Nov. 9th. Evening.

"There has been increased artillery activity along the Trentino frontier, and aeroplanes are also more in evidence on both sides."

"On the night of the 8th, one of our dirigibles, rising above a thick bank of clouds, reached the district between the Isonzo and the Vippacco. The airship subsequently came out of the clouds near Savogna, and was discovered by the enemy's searchlights. Anti-aircraft guns fired at her, but she got away, and returned safe and sound."

German.

Berlin, Nov. 3rd.

"East of Peronne an English aeroplane was forced to descend by the fire of our infantry. The pilot, an officer, has been taken prisoner."

Berlin, Nov. 8th.

"Lieutenant Ingelmann yesterday shot down his sixth enemy aeroplane west of Douai, which was an English Bristol biplane, armed with three machine-guns."

Austrian.

Vienna, Nov. 1st.

"In the north-eastern war theatre during October the booty of the armies under Austro-Hungarian command amounted to 142 officers, 26,000 men, 44 machine guns, one cannon, three aeroplanes and other war material."

Vienna, Nov. 3rd.

"To-day, after midnight, an airship dropped numerous bombs on Gorizia."

Vienna, Nov. 5th.

"An Italian airship threw bombs on Miramar."

Turkish.

Constantinople, Nov. 9th.

"On November 6th, an enemy aeroplane, damaged by fire, fell in the sea near Kuchuk-Kemikli, and our artillery again damaged the machine. It was then towed by the enemy to the bank near hospital ships."

THE BRITISH AIR SERVICES.

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

THE following appeared among the Admiralty announcements of the 3rd inst.:-

Temporary Flight Sub-Lieut. A. J. O'Reilly to "President," additional, for R.N.A.S. Sept. 15th.

The following appeared among the Admiralty announcements of the 6th inst.:-

Acting Flight-Lieut. Frederick J. Rutland has been confirmed in rank of Flight-Lieutenant, with original seniority of May 30th, 1915.

Probationary Flight Sub-Lieutenant (temporary): The following have been confirmed in rank of Temporary Flight Sub-Lieutenants, with original seniority: James G. Struthers, Francis N. Halsted, William E. Gardner, Colin W. Jamieson, Walter T. S. Williams, Arthur F. Buck, Ivan de B. Daly, Alfred M. Blake, Edward A. Pearson, Stanley A. Turpin, Hugh R. C. Dewes, Norman G.

Stewart Dawson, Miles J. G. Day, Clifford W. Elliot, Charles T. Freeman, Cecil H. Brinsmead, John B. Cussen, Arthur E. Hawker, and Gerrard W. R. Faue.

The following have been confirmed in rank of Flight Sub-Lieutenants, with original seniority: Lewis Morgan, Henry K. Thorold, and Percy Roach-Pierson.

Petty Officer O. C. Williams granted a temporary commission as Lieutenant, with seniority Nov. 5th.

Alfred M. Hughes entered as Probationary Flight Sub-Lieutenant, with temporary service, and appointed to "President," additional, for R.N.A.S. Dated Nov. 7th.

The following appeared among the Admiralty announcements of the 8th inst.:-

G. W. Hulse granted a temporary commission as Lieutenant (R.N.V.R.), with seniority of Nov. 5th, and appointed to "President II," for Inspectional Duties.

The following appeared among the Admiralty announcements of the 9th inst.:-

The following entries have been made:

Probationary Flight Sub-Lieutenants (temporary).—D. M. West (Temporary Sub-Lieutenant (R.N.V.R.)), H. A. Pallthorpe (A.B., R.N.V.R.), H. R. Aird and C. E. Burden, all with seniority of Nov. 8th, and appointed to "President," additional, for R.N.A.S.

Warrant Officer, 2nd Grade (temporary).—W. E. Norton (Petty Officer, R.N.V.R.), with seniority of Nov. 8th, and appointed to "President," additional, for R.N.A.S.

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 3rd inst. :—

Flying Officers.—Oct. 14th, 1915: Capt. W. B. Crossley, Lancashire Fus. (T.F.); Temporary Lieut. G. H. A. Hawkins, Manchester Regt. (T.F.); Second Lieut. P. A. Steenkamp, 1st (King's) Dragoon Guards, and to be seconded; Second Lieut. W. P. Cort, Special Reserve; Second Lieut. M. Minter, Special Reserve; Second Lieut. S. E. Cowan, Special Reserve. Oct. 19th, 1915: Temporary Second Lieut. R. Raymond-Barker, Northumberland Fus., and to be transferred to the General List; Second Lieut. H. Tomlinson, Special Reserve; Second Lieut. H. H. Bright, Special Reserve.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank: William P. Cort and Mervyn Minter. Gerard A. Crane to be Second Lieutenant (on probation); Oct. 15th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 4th inst. :—

Flying Officers.—Oct. 23rd, 1915: Lieut. T. W. P. L. Chaloner, Alexandra, Princess of Wales's Own (Yorkshire Regt.) (T.F.), from an Assistant Equipment Officer; Temporary Second Lieut. C. H. Elliott-Smith, Bedfordshire Regt., and to be transferred to the General List; Second Lieut. A. C. Watt, Gordon Highlanders, and to be seconded.

Supplementary to Regular Corps.—Second Lieut. Lord Hugh R. H. Gascoigne-Cecil to be Lieutenant: Oct. 15th, 1915. Second Lieutenants (on probation) confirmed in their rank: Edward A. Richards and Reginald Groves.

The following appeared in the *London Gazette* of the 5th inst. :—

Flying Officers to be Flight-Commanders.—Oct. 19th, 1915: Major Thomas C. R. Higgins, King's Own (Royal Lancaster Regt.); Major Bernard F. Vernon Harcourt, Welsh Regt.; Lieut. Edgar J. Bannatyne, 19th (Queen Alexandra's Own Royal) Hussars, and to be Temporary Captain whilst so employed.

Wing-Adjutant.—Temporary Second Lieut. J. B. Solomon, Oxfordshire and Buckinghamshire L.I., and to be Temporary Captain whilst so employed, vice Capt. Lord R. E. Innes-Ker, Irish Guards, Special Reserve; Oct. 15th, 1915.

Flying Officers.—Oct. 18th, 1915: Capt. H. F. A. Gordon, York and Lancaster Regt., and to be seconded; Lieut. A. P. Dickie,

Black Watch (Royal Highlanders) (T.F.); Temporary Lieut. W. H. Primrose, Princess Louise's (Argyll and Sutherland Highlanders) (T.F.); Lieut. C. H. Dixon, King's Own (Yorkshire L.I.), Special Reserve, and to be seconded; Lieut. R. Blatherwick, Royal Scots Fusiliers, Special Reserve, and to be seconded; Second Lieut. F. D. Lord Doune, Scottish Horse Yeomanry (T.F.); Temporary Second Lieut. D. Tweedie-Smith, Duke of Cambridge's Own (Middlesex Regt.), and to be transferred to the General List; Temporary Second Lieut. G. Wigglesworth, A.S.C., and to be transferred to the General List; Temporary Second Lieut. R. P. Turner, General List. Temporary Lieut. G. A. Burney, Scottish Horse Yeomanry (T.F.); Oct. 19th, 1915.

Supplementary to Regular Corps.—The date of the appointment of Second Lieut. (on probation) Sidney Ransom is Sept. 24th, 1915, and not as stated in the *Gazette* of Oct. 16th, 1915.

To be Second Lieutenants (on probation): Oct. 16th, 1915: W. Green and Thomas G. Clarson. Morton C. Evans; Nov. 1st, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 6th inst. :—

Lincolnshire Regt.—Flight Sergt. F. C. V. Laws, Royal Flying Corps, to be Second Lieutenant and seconded for service with the Royal Flying Corps. Nov. 7th.

Supplementary to Regular Corps.—Robert K. Shives to be Second Lieutenant (on probation); Oct. 5th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 8th inst. :—

Flight-Commanders.—Capt. S. Hutcheson, 3rd Brahmins, Indian Army, from a Flying Officer; Nov. 5th, 1915. Major R. E. T. Hogg, C.I.E., 38th King George's Own Central India Horse, Indian Army; Nov. 6th, 1915.

Warrant Officers to be Second Lieutenants for Service in the Field: Prince Albert's (Somerset L.I.); Oct. 8th, 1915: Sergt.-Major Henry R. Vagg, Sergt.-Major T. Bullen, and Sergt.-Major Robert S. Rumbold, all from Royal Flying Corps, and to be seconded for duty with Royal Flying Corps.

The following appeared in the *London Gazette* of the 9th inst. :—

Wing-Commander.—Brevet Major John H. W. Becke, Sherwood Foresters (Nottinghamshire and Derbyshire Regt.), from a Squadron-Commander, and to be Temporary Lieutenant-Colonel whilst so employed. Nov. 1st, 1915.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank: Donald Easdale, Geoffrey D. Pidgeon, Thomas W. Webb, William J. King, Francis S. Creswell, Bernard V. Grealy, Clair St. Noble, Herbert M. Fulton, Peter P. Eckersley, George D. Hannay, Philip K. Turner.

FURTHER REWARDS FOR R.F.C. OFFICERS.

IN a supplement to the *London Gazette*, issued on the 4th inst., it was announced that His Majesty the King had been graciously pleased to approve of the appointment of the undermentioned officers to be Companions of the Distinguished Service Order, in recognition of their gallantry and devotion to duty in the field :—

Lieutenant (Temporary Captain) GUY LINDSAY CRUIKSHANK, Gordon Highlanders and R.F.C.

For conspicuous gallantry in France on September 29th, 1915, when he successfully carried out a special mission involving very great risk.

Lieutenant (Temporary Captain) GEORGE AUBREY KENNEDY LAWRENCE, R.A. and R.F.C.

For conspicuous and repeated acts of gallantry in France, notably the following: On September 21st, 1915, he completed a reconnaissance to points sixty miles inside the German lines, although repeatedly attacked by a hostile machine. On September 25th he attacked and hit a moving train near Lille, descending to 600 feet. On September 26th he attacked and drove off a hostile aeroplane which was interfering with our bombing machines. On September 30th he carried out a three-hour reconnaissance in very bad weather. Although his machine was hit in seventy places by anti-aircraft guns on crossing the German lines on his way out, he carried on and completed his work.

It was further announced that His Majesty the King had been graciously pleased to confer the Military Cross on the undermentioned officers in recognition of their gallantry and devotion to duty in the field :—

Lieutenant (Temporary Captain) CUTHBERT EUAN CHARLES RABAGLIATI, The King's Own (Yorkshire L.I.) and R.F.C.

For conspicuous gallantry and skill on September 28th, 1915, when, accompanied by Second Lieutenant Vaucour, they carried

out a reconnaissance over Valenciennes and Douai. They had to fly in thick cloud for nearly the whole distance, and several times their aeroplane got into a "spin." The pilot, however, succeeded each time in righting his machine, and they reached their objective and carried out the reconnaissance at 2,800 feet under very heavy fire.

Temporary Second Lieutenant AWDRY MORRIS VAUCOUR, R.F.A. and R.F.C.

For conspicuous gallantry and skill on September 28th, 1915, when, accompanied by Captain Rabagliati, they carried out a reconnaissance over Valenciennes and Douai. They had to fly in thick cloud for nearly the whole distance, and several times their aeroplane got into a "spin." The pilot, however, succeeded each time in righting his machine, and they reached their objective and carried out the reconnaissance at 2,800 feet under very heavy fire.

French Honours for the R.F.C.

IN a supplement to the *London Gazette*, issued on the 6th inst., it was announced that the President of the French Republic has been pleased to confer the decoration of the Legion of Honour on the undermentioned Officers, with the approval of His Majesty the King, for distinguished Service in the Field :—

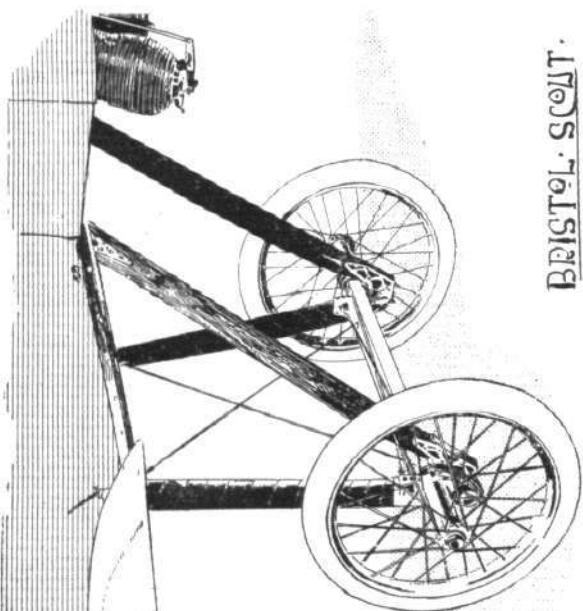
Croix de Commandeur.

Major-General Sir DAVID HENDERSON, K.C.B., D.S.O.

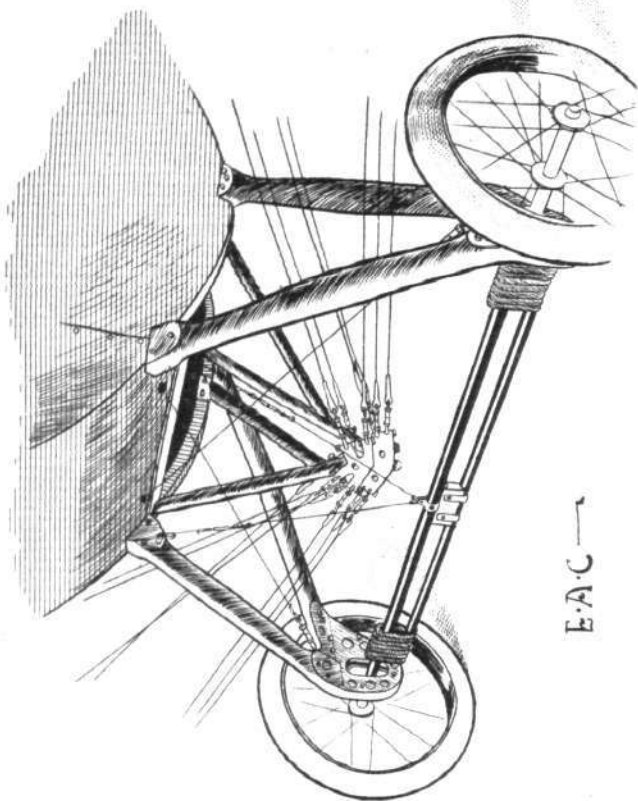
Croix de Chevalier.

Lieutenant (Temporary Captain) JAMES VALENTINE, Royal Flying Corps (Special Reserve).

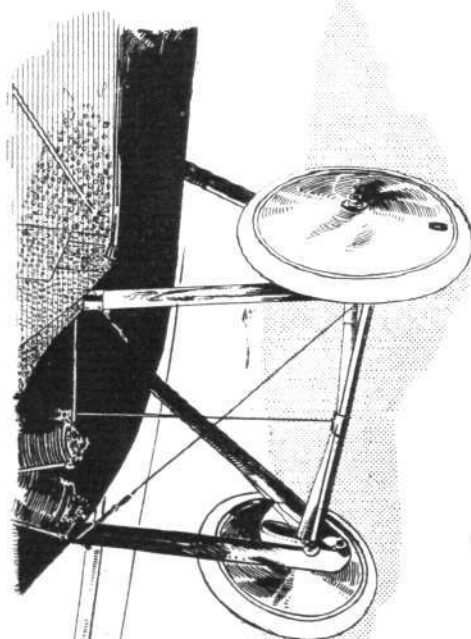
CONSTRUCTIONAL DETAILS.—X.



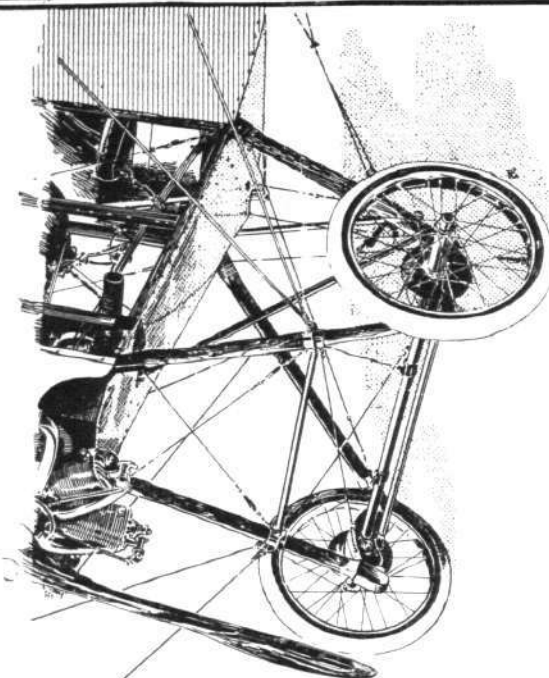
BRISTOL-SCOTT.



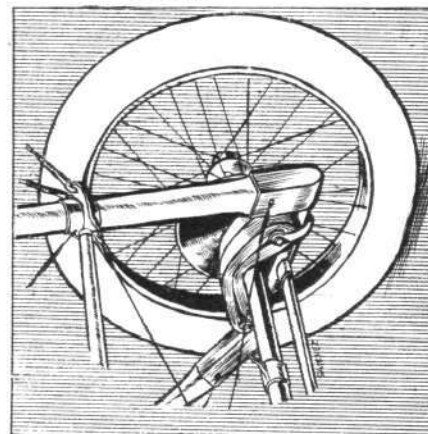
E.A.C.



SEPITH.



BATMATT SADCAEZ



Various "Vee"-type undercarriages constructed of wood. (See text page 871.)

CONSTRUCTIONAL DETAILS.—X.

UNDERCARRIAGES of the "Vee" type and constructed of steel tubes were dealt with in our last issue, and some of the relative advantages of the two forms of construction, steel and wood, were pointed out. In our present page of illustrations are shown a few examples of how the construction of a "Vee" undercarriage may be carried out when the material employed is wood. A very simple type of chassis, offering a minimum of head resistance, is that of the Bristol scouting biplane, the first of which was exhibited, as our readers will remember, at the Olympia Aero Show in 1914. A good deal of criticism of this chassis was vouchsafed at the time from various quarters, mainly on the grounds that spruce struts had been used, and that the rear struts were much more nearly vertical than is usual practice. Since then, however, Bristol scouts have done some exceedingly good work, and as far as one can gather, the undercarriage has, without being materially altered, proved equal to the work for which it was designed. The four struts that constitute the chassis are secured at the top to the lower longitudinals of the body by steel clips, and are joined together two and two at their lower ends by other steel clips bolted through the lower, flat portion of the struts. From these clips project outwards on each side short lugs, to which are anchored the rubber cords that provide the flexible suspension of the wheels.

The single tubular axle rests in the angle between the struts, and is prevented from moving sideways by steel wires running from the rear chassis strut on one side to the opposite end of the axle. No radius rods are fitted, the rear struts being so nearly vertical that they prevent the axle from moving back to any appreciable extent.

In the Sopwith undercarriage illustrated the same simplicity prevails. Here, however, the axle is divided in the centre, where it is pivoted between the two transverse members joining the apexes of the chassis struts. In order to prevent a downward movement of

the centre of these members a single wire is taken from this point to the bottom of the body. Transverse rigidity is established by diagonal cross bracing between the front pair of chassis struts as shown in the sketch. This undercarriage, it should be pointed out, is not that fitted as standard on the Sopwith scouts. It was, in fact, quickly produced for the last Aerial Derby, the original chassis of these machines being of the double-skid type. Since then other types have been experimented with, among these being one with no shock absorbers, but having wheels fitted with large diameter pneumatic tyres.

Another form of simple Vee undercarriage is that of the Eastbourne Aviation Co.'s monoplane. In this machine the wheel track was comparatively wide, necessitating a differently-shaped apex of the "Vee." The two struts, it will be seen, converge a short distance above the wheel axle, and are here joined to a vertical block of wood, in which is cut a slot for the axle. The axle runs right across from side to side, buckling in the centre being prevented by a Vee formed by two wires as shown, while the rebound is taken by a rubber cushion secured to the tubular transverse member of the undercarriage. The *cabane* of steel tubes in the centre of the chassis does not, of course, form part of it, but serves as a support for the lift cables, the machine being a monoplane.

The last undercarriage shown on our page of illustrations this week, the Bathiat-Sanchez, does not perhaps strictly speaking constitute a "Vee" type, since the lower ends of its struts are not joined together directly. The short steel tube that supports the shock absorbers could hardly be called skids, however, and the chassis has therefore been included among the "Vee" types. The method of attaching the shock absorbers as well as the anchorage of the lift-cables will be easily understood from the sketches. The warp cables, this machine being a monoplane, are attached to a three-corned pyramid formed by three steel tubes and not being, of course, part of the undercarriage itself.



The Production of Military Aeroplanes.

IN the House of Commons on Tuesday, Mr. Lynch asked the Under-Secretary for War whether, in view of the activity displayed by the Germans of late in the production of large and fast aeroplanes, the War Office was taking appropriate steps so that this country might successfully compete with them.

Mr. Tennant: Yes, sir.

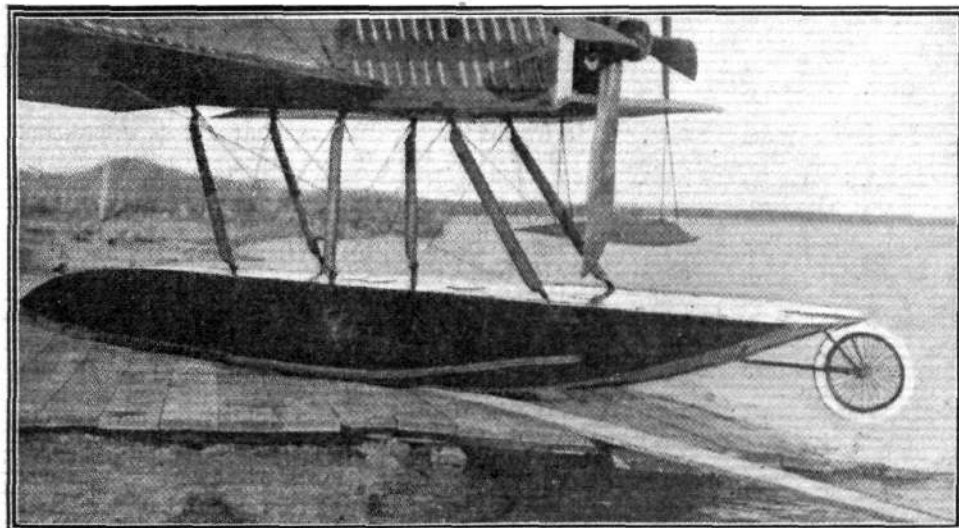
Mr. Lynch: Have the Government established factories for

building aeroplanes, or does it content itself simply with supervising work done by firms?

Mr. Tennant: As the hon. member knows, we have a Government factory, and we also have samples and drawings of aeroplanes submitted to us for our approval.

Mr. Lynch: Has the Government factory produced anything?

Mr. Tennant: Yes, sir, it produced a great deal which has shown great superiority over the Germans.



In a recent issue we published a photograph of one of the latest American seaplanes—the Glenn Martin. In the accompanying illustration is shown more clearly the wheel which is mounted on the main central float to prevent the machine from turning over on its nose when running up on the slipway after a flight.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING.

A SPECIAL MEETING of The Committee was held on Tuesday, the 9th inst., when there were present:—Prof. A. K. Huntington, in the Chair, Mr. Ernest C. Bucknall, Flight Lieut. C. F. Pollock, R.N.A.S., and the Assistant Secretary.

Election of Members.—The following New Members were elected:—

- Lieut. James Fredric Lester Hartmann (3rd Gloucester Regt.).
- Capt. John Henderson Jenkins, R.F.A.
- Lieut. Charles Vere Maybery, R.N.V.R.
- Lieut. Nicholas Jarvis Wood.

Aviators' Certificates.—The granting of Aviators' Certificates Nos. 1930 to 1961 was confirmed.

The granting of the following Aviators' Certificates was confirmed:—

- 1962 Lieut. John Hilliard Simpson (Maurice Farman Biplane, Military School, Farnborough). Aug. 27th, 1915.
- 1963 Capt. Nevill Ashby Leeson (1st East Lancashire Regt.) (Maurice Farman Biplane, Military School, Farnborough). Oct. 6th, 1915.
- 1964 Flight Sub-Lieut. Cecil Richard Blagrove, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Eastbourne). Oct. 9th, 1915.
- 1965 2nd Lieut. Alfred William Clifford Vernon Parr (Rifle Brigade (Maurice Farman Biplane, Military School, Farnborough). Oct. 11th, 1915.
- 1966 2nd Lieut. Douglas G. Liddle (8th Buffs) (Maurice Farman Biplane, Military School, Shoreham). Oct. 17th, 1915.
- 1967 Lieut. Ralph Newton Adams (7th Royal Fusiliers) (Maurice Farman Biplane, Military School, Shoreham). Oct. 17th, 1915.
- 1968 Flight Sub-Lieut. Eric Thompson Bradley, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Oct. 21st, 1915.
- 1969 2nd Lieut. Cyril Telford Latch (Maurice Farman Biplane, Military School, Shoreham). Oct. 22nd, 1915.
- 1970 2nd Lieut. Stephen William Price (8th Leicestershire Regt.) (Maurice Farman Biplane, Military School, Ruislip). Oct. 27th, 1915.
- 1971 Major Arthur French-Brewster, M.M.G. Service (Maurice Farman Biplane, Royal Naval Flying School, Eastchurch). Oct. 27th, 1915.
- 1972 2nd Lieut. Walter Llewellyn Clark (15th Middlesex Regt.) (Maurice Farman Biplane, Military School, Shoreham). Oct. 29th, 1915.
- 1973 Flight Sub-Lieut. Ralph Spickernell, R.N.A.S. (Maurice Farman Biplane, Royal Naval Air Station, Eastbourne). Oct. 29th, 1915.
- 1974 2nd Lieut. Oscar Alfred Westendarp (Wiltshire Regiment) (Maurice Farman Biplane, Military School, Norwich). Oct. 29th, 1915.
- 1975 William Eric Louis Seward (Hall Biplane, Hall School, Hendon). Oct. 29th, 1915.
- 1976 Lieut. Robert Benedict Bourdillon, R.F.C., S.R. (Maurice Farman Biplane, Central Flying School, Upavon). Oct. 29th, 1915.
- 1977 Niels Sorensen Bangs (American subject) (Hall Biplane, Hall School, Hendon). Oct. 29th, 1915.
- 1978 Flight Sub-Lieut. Harold Walter Evens, R.N.A.S. (Maurice Farman Biplane, Central Flying School, Upavon). Oct. 29th, 1915.
- 1979 2nd Lieut. William Robert Brown McBain, R.F.A. (Ruffy-Baumann Biplane, Ruffy-Baumann School, Hendon). Oct. 29th, 1915.
- 1980 Fred Hall (Hall Biplane, Hall School, Hendon). Oct. 30th, 1915.
- 1981 2nd Lieut. Leonard John Pearson, R.E. (Maurice Farman Biplane, Military School, Montrose). Nov. 3rd, 1915.
- 1982 Gordon Iredell (Maurice Farman Biplane, Military School, Brooklands). Nov. 3rd, 1915.
- 1983 Lieut. Ernest Royle Mortimer Griffin, A.S.C. (Maurice Farman Biplane, Military School, Birmingham). Nov. 3rd, 1915.
- 1984 Lieut. Trafford Jones (Maurice Farman Biplane, Military School, Birmingham). Nov. 3rd, 1915.

- 1985 2nd Lieut. Ronald Stephen Wells (9th Bedfordshire Regt.) (Maurice Farman Biplane, Military School, Birmingham). Nov. 3rd, 1915.
- 1986 2nd Lieut. Ralph Cyril Stoddard (10th South Lancashire Regt.) (Maurice Farman Biplane, Military School, Birmingham). Nov. 4th, 1915.
- 1987 George Carlton Mills (Maurice Farman Biplane, Military School, Brooklands). Nov. 5th, 1915.
- 1988 Lieut. James Stanley Scott, C.A. (Maurice Farman Biplane, Military School, Birmingham). Nov. 5th, 1915.
- 1989 2nd Lieut. Thomas Roy Irons (3rd Yorks and Lancashire Regt.) (Maurice Farman Biplane, Military School, Birmingham). Nov. 5th, 1915.
- 1990 2nd Lieut. Reginald John Lowcock (Maurice Farman Biplane, Military School, Birmingham). Nov. 5th, 1915.
- 1991 Capt. Gerald Audry Cadogan-Cowper (Caudron Biplane, Beatty School, Hendon). Nov. 6th, 1915.
- 1992 Flight Sub-Lieut. William Reginald Dainty, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 1993 Flight Sub-Lieut. William Spencer Wilson, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 1994 Flight Sub-Lieut. Henry Guy Holden, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 1995 Flight Sub-Lieut. Leo Philip Paine, R.N.A.S. (Maurice Farman Biplane, Royal Naval Flying School, Eastchurch). Nov. 6th, 1915.
- 1996 William Man (Grahame-White Biplane, Grahame-White School, Hendon). Nov. 6th, 1915.
- 1997 Flight Sub-Lieut. Richard Gregory Gardner, R.N.A.S. (Maurice Farman Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 1998 Flight Sub-Lieut. Alick Vansittart Bowater, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 1999 Allan Frank Lashmar (Caudron Biplane, Beatty School, Hendon). Nov. 6th, 1915.
- 2000 John Victor Nash (Caudron Biplane, Beatty School, Hendon). Nov. 7th, 1915.
- 2001 Flight Sub-Lieut. John Archer Sadler, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Nov. 7th, 1915.
- 2002 William George Stewart (Caudron Biplane, Ruffy-Baumann School, Hendon). Nov. 7th, 1915.
- 2003 Chester Stairs Duffus (Caudron Biplane, Beatty School, Hendon). Nov. 7th, 1915.
- 2004 Flight Sub-Lieut. Alfred Gammon, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Nov. 7th, 1915.

AMERICAN CERTIFICATE.

- 353 K. F. Saunders (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 19th, 1915.

The following Aviators' Certificates were granted:—

- 2005 J. J. Lynch (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 13th, 1915.
- 2006 Joseph William Hobbs (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 13th, 1915.
- 2007 V. P. Cronyn (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 15th, 1915.
- 2008 D. A. H. Nelles (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 15th, 1915.
- 2009 Stanley B. Lee (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 17th, 1915.
- 2010 Keith Waugh (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 17th, 1915.
- 2011 H. G. Leslie (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 19th, 1915.
- 2012 Garnet Hughes (Curtiss Biplane, Curtiss School, Toronto, Canada). Oct. 31st, 1915.
- 2013 Lieut. Cyril Wynyard Battye (2nd Royal Berkshire Regiment) (Maurice Farman Biplane, Military School, Farnborough). Nov. 3rd, 1915.

- 2014 Flight Sub-Lieut. John Frederick Horsey, R.N.A.S. (Grahame-White Biplane, Royal Naval Air Station, Chingford). Nov. 6th, 1915.
- 2015 Arthur Travers Harris (Maurice Farman Biplane, Military School, Brooklands). Nov. 6th, 1915.
- 2016 Arthur Holroyd O'Hara-Wood (Maurice Farman Biplane, Military School, Brooklands). Nov. 7th, 1915.
- 2017 2nd Lieut. Patrick Colin Campbell (4th Argyll and Sutherland Highlanders) (Caudron Biplane, Beatty School, Hendon). Nov. 8th, 1915.
- 2018 Gordon Law Morris (Maurice Farman Biplane, Military School, Brooklands). Nov. 8th, 1915.
- 2019 James Campbell Cunningham (Maurice Farman Biplane, Military School, Brooklands). Nov. 8th, 1915.
- 2020 William Hughes (Caudron Biplane, Ruffy-Baumann School, Hendon). Nov. 8th, 1915.
- 2021 Henry Fawcett (Caudron Biplane, Beatty School, Hendon). Nov. 8th, 1915.
- 2022 James Alfred Brown (Caudron Biplane, Beatty School, Hendon). Nov. 8th, 1915.

Aeronauts' Certificates.—The granting of the following Aeronauts' Certificates was confirmed:—

- 47 Flight Sub-Lieut. James Harold Dundas Grant, R.N.A.S. Nov. 8th, 1915.
- 48 2nd Lieut. George Osborn Hayne, R.F.C. Nov. 8th, 1915.

Extension of the Hours of Opening the Club.

The Club is now open from 9 a.m. to 10.30 p.m. each day, including Sunday.

New Members.

Members are reminded that, according to the Rules, the Annual Subscription of any New Member they may propose, who is elected between November 1st and December 31st of this year, will cover the period up to December 31st, 1916.

THE FLYING SERVICES FUND

administered by
THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

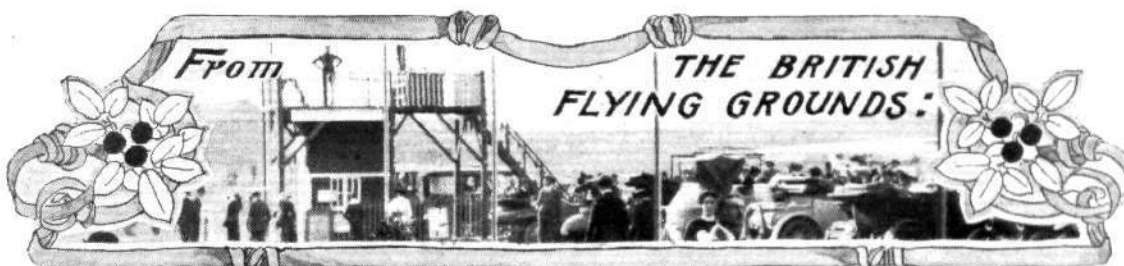
Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Nov. 3rd, 1915...	10,000	0	0
Staff and Workers of Gwynnes, Ltd. (Second contribution) ...	8	0	3
Collected at the Westland Aircraft Works, Yeovil (Eighth contribution) ...	0	9	8

Total, November 10th, 1915 ... 10,008 9 11

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.



London Aerodrome, Collindale Avenue, Hendon.

Grahame-White Civilian School.—Pupils with Instructor last week: Messrs. Franck, Gammon, Halet, Holman and McConnel. Doing straights or rolling alone: Mr. Horridge. Circuits with Instructor: Messrs. Fraser and Hughes. Messrs. Jones and Spencer absent. Machines in use: Grahame-White biplanes. Instructors: Messrs. Manton, Pashley, Russell and Winter.

Grahame-White School (R.N.A.S.)—Pupils with Instructor: Probationary Flight Sub-Lieuts. Armitage, Horniman, Moody and Ovens. Circuits with Instructor: Probationary Flight Sub-Lieuts. Aplin, Davenport and Graham. Circuits alone: Probationary Flight Sub-Lieuts. Cross, Gammon and Sadler. Machines in use: Grahame-White biplanes. Instructors: Messrs. Manton, Pashley, Russell and Winter. Certificate was taken by Probationary Flight Sub-Lieut. Man.

Beatty School.—The following pupils were out during the week: Messrs. Baker, Barrow, Begg, Bowick, Brown, Brynildsen, Campbell, Collier, Cumming, Duffus, Edwards, Fellowes, Hodgson, Lashmar, Mellings, Murdoch, Nash, Nicholson, Owen, Patterson, Podmore, Samter, Schollaert, Symington, Halford-Thompson, Whincup, Barnes, and Godfrey.

The instructors were Messrs. G. W. Beatty, W. Roche-Kelly, R. W. Kenworthy, G. Virgilio, A. E. Mitchell, and L. L. King, the machines in use being Beatty-Wright dual-control and single-seater propeller biplanes, and Caudron tractor biplanes.

Certificates were taken during the week by Capt.

Cadogan-Cowper and Messrs. Lashmar, Nash and Duffus.

Exhibition flights were given on Thursday, Saturday and Sunday by Messrs. Roche-Kelly, Kenworthy and Virgilio.

Hall School.—Owing to terrific gales during the past week practice was not up to usual standard at the Hall School. However, good practice was put in by the pupils, who turned up regularly. With Instructor Cecil M. Hill: Messrs. Broad, Nicolle, Butterworth, Drew, Stirling, Dodd, Evans, Punnett, and Wilkins. With Instructor Charles Bell: Messrs. Wooley, Lieut. Bell, Redford, Mann, Smith, Arnsby, Capt. Grey, Milbourne, Cosgrave, Chapman, Bond, Thom, Bennett, Niel, and Baron Ackroyd.

Machines in use: Hall tractor (Government type) biplanes; five in use.

Owing to an oversight it was omitted in last week's report that Mr. Seward took a very good certificate.

London and Provincial Aviation Co.—Pupils doing rolling last week: Messrs. Dawson, Roberts, Lees, Scott, Lambert, Hunt, Atkinson, Heyn and Summerskill. Straights: Messrs. Braim, Thorpe, Porter, Knowles, Renton, Lewis, Burgess, Woods and Hardy. Circuits: Messrs. Franklin and W. Warren, Jun.

Instructors: Messrs. M. G. Smiles, W. T. Warren and C. M. Jacques.

Ruffy-Baumann School.—Pupils with instructor last week: Harkness, de Grauw, Flanders, Willy Coppens,



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PUPILS WHO HAVE RECENTLY OBTAINED ROYAL AERO CLUB CERTIFICATES.—1. 2nd Lieut. G. Joseph L. Welsford, Middlesex Regt. (L. and P. School). 2. Warrant Officer G. Bowen, R.N. (Chingford Aerodrome). 3. Lieut. V. O. Rees, 23rd London Regt. (Ruffy-Baumann School). 4. 2nd Lieut. S. C. T. Littlewood (Hall School). 5. Flight Sub-Lieut. L. W. Hodges, R.N.A.S. (Grahame-White School). 6. 2nd Lieut. W. N. Thomas, 3rd Shropshire L.I. (Beatty School).

Launoit, Stuart Cole, Cuthbertson, Bolton, Fraser, Pauli, Vernon, Wood and Laidlaw. Straights or rolling: Stewart, Liddell, de Grauw, W. Coppens, Thomson, Sherwood, Yiule, Bailey and Griffiths. Eights or circuits: Stewart and Liddell.

Instructors for the week: Edouard Baumann, Felix

Ruffy, Ami Baumann and Clarence Winchester. Machines: Three Ruffy-Baumann (60 and 50 h.p.) Caudron-type tractor biplanes.

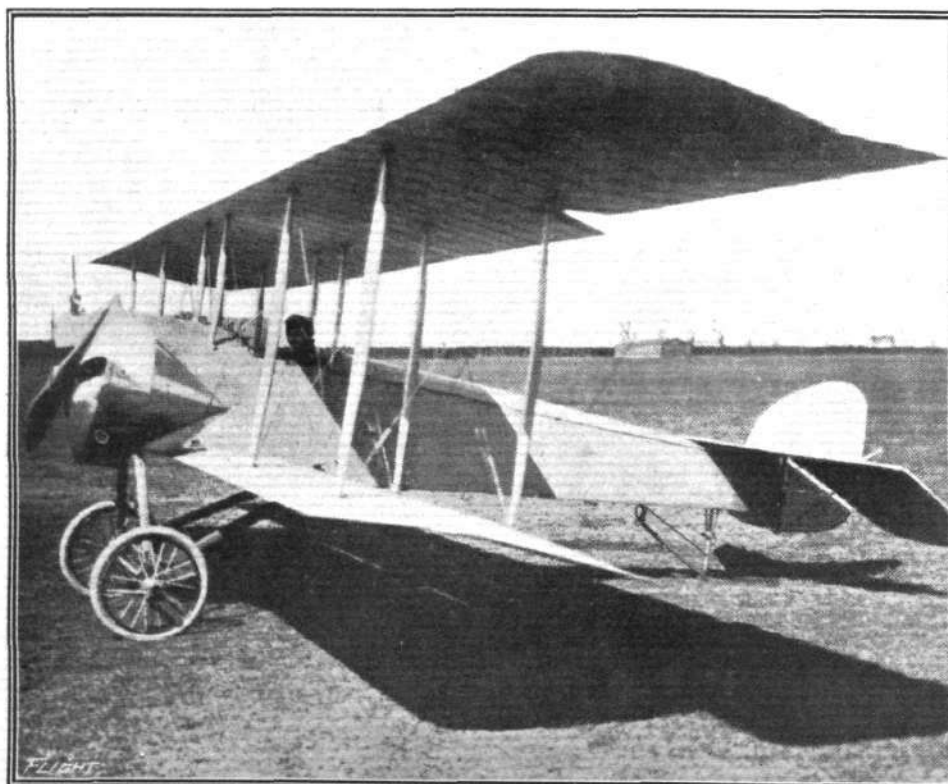
Although the weather was extraordinarily unfavourable a reasonable time was spent in the air as well as in the workshops.



Women Workers and Aircraft.

AMONG classes started by the Women's Service Bureau, 58, Victoria Street, Westminster, to enable women to prepare for

definite posts as munition workers, are those dealing with oxy-acetylene welding, especially with a view to aircraft construction, training from mechanical drawings, &c.



Miss Katherine Stinson at the wheel of her new tractor, in which she has been looping the loop at Chicago. Miss Stinson, it is claimed, is the first woman pilot to loop the loop.



LAST Saturday afternoon proved to be a fairly eventful one, as regards two incidents at any rate. Both of these were of an unexpected nature, and served as an acceptable diversion from the somewhat monotonous aspect the war has cast on the meetings at Hendon. Incident number one was the very welcome but, unfortunately, only temporary return to the aerodrome of our old friend Louis Noel, who, as his array of decorations bear witness, has done much good work in France during the last twelve months or more. Having obtained a few days' leave before he again takes up his duties, this time in fields afresh, he snatched the opportunity of paying a visit to Hendon, and those of its inmates who have not been called away to other spheres of activity. Needless to say, he received a warm reception, and was much interested in the many changes that have taken place at the aerodrome during the last twelvemonth.

The second incident was the flying visit of an unknown pilot on a chunk of greased lightning disguised as a scout-biplane. He suddenly appeared over the aerodrome, descended to a few hundred feet, and executed two of the finest loops I have ever seen. They were not only perfectly clean and in rapid succession, but the machine climbed on each loop in a remarkable manner. He then gave us a display of speed and "vertical" climbs, executed another loop starting at a height of about 250 feet, and then vanished! Some wizard! Even Louis Noel, who has had the opportunity of witnessing many types of "extra special" war-planes in flight, expressed a most enthusiastic opinion on the whole performance. It was, he said, the fastest 'bus he had seen, and asked me to convey to the pilot and designer his congratulations, which I take the opportunity of doing here. We managed during the stranger's passing over to secure a good snap of him right way up, and also at the moment of his chassis facing the heavens. We are hoping to publish these unique photos.; but if they are censored for the moment—well, later on they will be just as interesting.

In the meanwhile the usual proceedings had started, the various schools got going, and exhibitions and passenger flights got so thoroughly mixed up with them it was impossible to tell whether it was Manton executing stunts on a 60 h.p. G.-W. 'bus or a pupil in difficulties, a pupil making a straight or a crack pilot just landing. However, I think I am safe in saying that nearly everybody was at work, even if I do not mention them by name. W. Birchenough, I know, was out on the 120 h.p. (Beardmore) De Havilland pusher gun 'bus,

and A. E. Barrs also made a flight, lasting about 15 minutes, on the 125 h.p. Mann biplane. C. Pashley put some B.E 2cs through their tests, and a couple of



A VISITOR AT HENDON FROM FRANCE.—Adjutant-Aviateur Louis Noel (on right) and Marcus D. Manton.

Burgess pushers were out. These 'buses, I understand, have given some very good results.

Sunday's proceedings consisted mostly of school work. Marcus D. Manton and M. Osipenko were both busy with pupils on the 60 h.p. G.-W. 'buses, and C. Pashley and J. S. B. Winter took up passengers on similar machines. R. Kenworthy and W. Roche-Kelly were out on the 50 h.p. Beatty-Wrights, and G. Virgilio flew the 45 h.p. Beatty-Caudron. J. L. Hall, also, was very busy with his pupils, one or two of the latter making some very good flights.

Thinning the Zeppelin Fleet.

INFORMATION obtained by the Brussels correspondent of the *Journal des Debats*, it is stated, confirms the rumours current for some time in Paris of the loss of another Zeppelin in Belgium. It is stated that on October 13th, following an explosion, a Zeppelin fell near Poix Saint Hubert, on the Namur-Arlon line, and was totally destroyed. Part of the crew was saved. Elaborate precautions were taken to hide the news of the accident from the public.

Reparation for Air Raids.

REPLYING to a question by Sir A. Markham in the House of Commons on the 4th inst., the Prime Minister stated that without prejudice to such steps as may be taken on the termination of the war for securing due reparation for outrages inflicted by the enemy upon non-combatants, he was not at present prepared to notify to the German Government in advance what procedure we should adopt.



LONDON'S 1915-16 LORD MAYOR— SIR CHARLES C. WAKEFIELD.

IN our last issue we were able to just briefly record the fact that London's new Lord Mayor had by a characteristically kindly thought, again evinced his keen interest in aviation affairs by contributing the necessary amount to carry the total received by the Flying Services Fund to an even £10,000. It hardly needed this, however, to remind our readers that Sir Charles Cheers Wakefield has always been anxious to do whatever lay in his power to forward the cause of aviation. It will be recalled that a long time back he made an eloquent appeal at the Mansion House for more attention to be given by the Government to military aeronautics, but his words largely fell on stony ground. Sometime ago, too, he offered a prize of £500 to the aviator who should first bring down a Zeppelin. So that both sentimentally and practically Sir Charles Wakefield deserves well of the industry irrespective of his commercial association with aviation. In this connection it is almost superfluous to remind our readers that he was the founder of the firm bearing his name, and which he has piloted to its present position, as one of the most famous producers of lubricants for motor engines, especially for those for aircraft work.

To his business acumen Sir Charles is able to add a wide experience which has been gained in many parts of the world. Twice in his busy career he has circled the globe, and his knowledge of business opportunities in Japan and China is exemplified in his book entitled "Future Trade in the Far East." The book also showed Sir Charles' foresight, as it prophesied our alliance with Japan and the position which that country would inevitably take among the nations of the world.

Sir Charles Wakefield possesses several foreign orders, among them the Belgian orders of the Crown and of Leopold and the cross of an officer of the Legion of

Honour, conferred by President Fallières during his State visit to the City when Sir Charles was Sheriff in 1907. Two decorations greatly prized by Sir Charles are the Order of Mercy and the Order of St. John of Jerusalem, recognitions of the good work performed by him on behalf of the hospitals, the Red Cross and various patriotic funds. Space forbids to set forth all Sir Charles' activities in the sweet cause of charity.

A keen art collector, Sir Charles has generously presented works by Frank Brangwyn and a bust of Queen Alexandra by Sir George Frampton to the Guildhall Art Gallery, and is a donor of a panel, depicting King Alfred building the walls of the City, on the walls of the Royal Exchange.

On Monday last Sir Charles Wakefield was duly installed at the Guildhall, and on the following day there was the time-honoured procession to the Law Courts, &c. Naturally this year the "show" partook of the nature of a military pageant, and conspicuous among the many phases of the Army's work seen was that of the Motor Transport and the Royal Flying Corps, the latter being represented by a dismantled B.E. biplane. The Royal Navy, on whom rests the responsibility for the defence of London against hostile aircraft, also had their place with some of their mobile anti-aircraft weapons mounted on motor vehicles. Forming part of our heading to this page, are interesting photographs showing the items in the procession which more immediately concern aviation.

On the left is seen the B.E. biplane, and on the right the anti-aircraft guns, while below, emblematic as it were of the final victory, which it is hoped will ensue, followed by suitable rejoicings, during Sir Charles Wakefield's year of office, is seen one of the German guns recently captured.



"Lord, what fools these mortals be."—Midsummer Night's Dream.

NOT since childhood have I been interested in those Life Guards with their shining breast-plate and helmet, astride their horses so sedately, half in and half out of their little alcoves in Whitehall. I had their like at home in those days, each fitting into its cut-out in the false bottom of a cardboard box. With cone-shaped wooden trees I could make a fair representation of the Mall with its beautifully-pruned plane trees, the like of which cannot be found.

These many years I have sat within sound of the bands of my Lord Mayor's Procession, and moved not one step towards the window which should give me sight of the gay uniforms passing the end of the street. To-morrow—I am writing this on Monday—I am going out into the streets.

Our Royal Flying Corps is going to take part in the procession, and I am going to cheer them as they pass, these first and second A. Ms., these patient good-humoured optimists, who cheerfully work through the long hours of the night when necessary, to place in the Eastern, morning sunshine, all spick and span and ready for service, their charge "gone west" the previous evening.

But, I shall confess it, this is not the only reason I shall see the show to-morrow. I have, like many of my age, been getting old too quickly.

I realise that I have been unconsciously travelling the route I decided for at the forked roads where stands the eighteenth milestone, where I chose the road leading to manhood, where I became, somehow, ashamed of youth, ashamed, unnecessarily, of those past eighteen miles. I have plodded on, and never looked back, and—I am grown drab.

To-morrow I am going out to feast me on the bright colours, on the Gilded Coach. I will buy one of those penny streamers depicting the procession as it never happened—this time, I hope, printed in England. I am going to call it The Lord Mayor's Show, and not Procession, and I am going to cheer.

It is well that we take our sorrows stolidly, but why of necessity should we also take our pleasures sadly?

Too eagerly did we decide for manhood at that early milestone, too easily did boyishness drop from us. So manly have we become, that we have ceased to be men, and are but self-conscious machines, dreading to smile, fearful of laughter lest we should suffer in our dignity.

It is time enough to count our leaves, and mark their russet colour, when they are fallen; remaining on the tree, let us think them green, and notice not their changing tint.

Is it, then, something of which to be ashamed—to admire colour, to enjoy, and attempt to copy nature so resplendent in her hues? Must we make this world dreary to ourselves by acknowledging only the greys and the drabs? Shall we cut out entirely the scarlets and the blues, the crimson and the gold? Did the Great Creator ever intend that the beautiful butterfly should

become a moth? Yet I fear I have chosen a bad year to emerge from the grey.

This is a grey year. We clothe our men in khaki—we paint our ships of war, drab. To-morrow I fear I shall not see those gay uniforms, the sight of which I have voluntarily missed these many years. My Lord Mayor's Coach shall be gilded as of old, I doubt not, yet it shall look odd and out of place in this procession of drab men—business-men—men who mean business—men who object to being taught the business of "kultur," knowing as they do that it is a drab business.

And to-morrow I shall see those men of the Royal Flying Corps—our men. They shall be garbed in grey, and shall look sober in their mien, because this is a drab year, yet I shall give them a cheer because they are *our* men, and because I can discern beneath their business uniform of khaki the golden principle of purpose.

And those other drab men—those of this regiment and of that. Those of Scotland and of Wales. Those of Ireland and of Australia, of Canada, of New Zealand, of all our glorious colonies, they shall all be drab, because this is a drab year. But beneath the drab there is colour—the most glorious colour—the colour of scarlet—scarlet blood that flows and ebbs for Motherland.

And these are our youth and manhood. Many of them not much past that eighteenth milestone, backward of which I have taught myself to be ashamed. At the forked roads they have become grey, but to some purpose—to fight for all that is beautiful. Those of my kidney became grey to no purpose except that of trying to pretend manhood. Manhood! can anything be more manly than this?

Let us throw off this stupid assumption of gravity. Let us no more pretend that we do not admire colour. Those of us that have a fondness for drab, and are of military age, let us assume the drab of the khaki uniform. Let us for the nonce become homeopathic and kill drab by drab. And those of us that be beyond the drab age except that of our seeking, yet can we do something to help. We can refrain from standing in the streets like wooden men when the troops and the recruits pass, as though it were no business of ours. We watch them as they pass from the Horse Guards' Parade on their way to the station—these recruits—played away by the band; recruits going to don the drab uniform on our behalf, yet we watch them in silence. It were unmanly to give them a cheer. We should feel silly should we show by our behaviour how we honoured them.

And to-morrow is my Lord Mayor's Show, and I am going out into the streets as I did of yore, because I have realised that it is of no use becoming drab without purpose. I doubt not it will be a wet day, and perhaps with fog. England, methinks, has caught the drab fever in a mild form, and must needs become drab just when I have woken up and wish to regain some of those wasted moments since the eighteenth milestone. Yet I shall not be downcast. I am going out into the streets, and although the colour that I wish for will not be there, still shall I cheer.

THE OTTO BIPLANES.

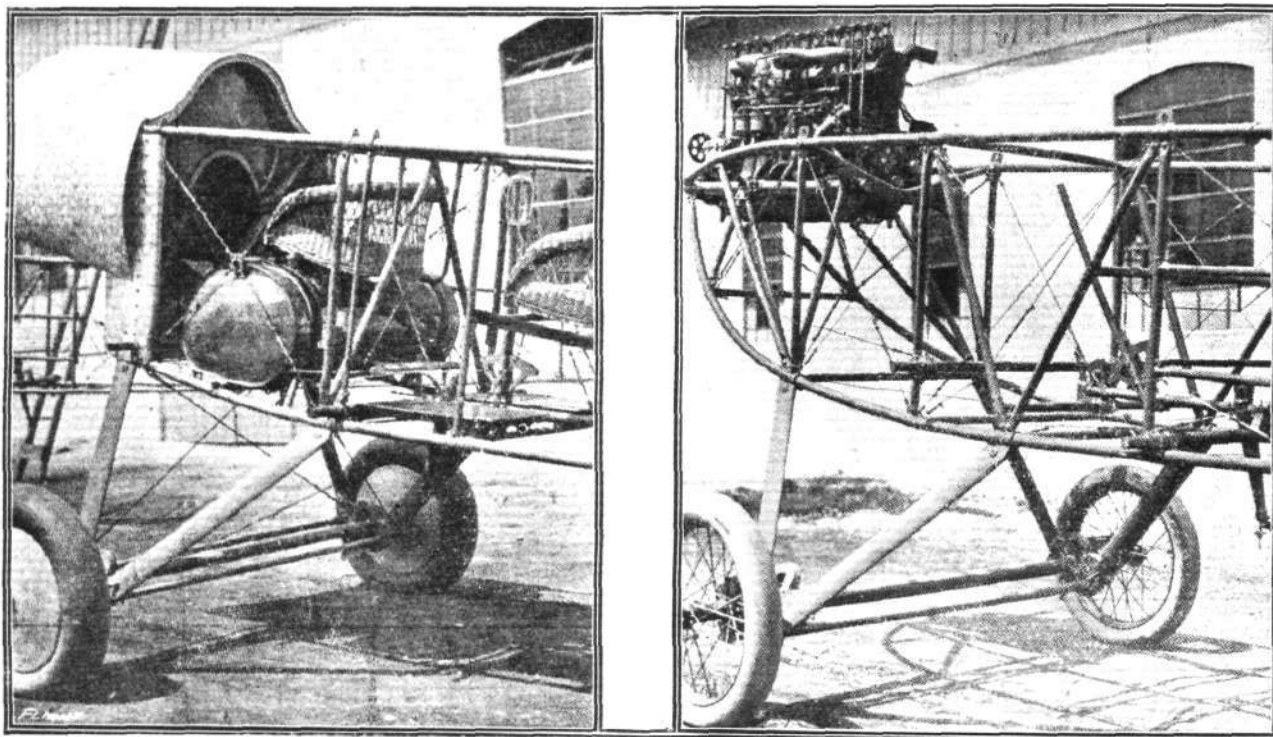
Of the German aeroplane constructors who have paid special attention to the development of the all-steel machine few have met with greater success than have the Otto works at Munich. In the accompanying illustrations are shown two types of *fuselages* which are similar as regards construction, but differ in that one is designed for a stationary engine, whilst the other is of a slightly different form in front to take a rotary motor. One feature common to all Otto machines is the employment throughout of seamless chrome nickel steel tubes for *longerons* and struts of the *fuselage*. The attachment of the struts to the *longerons* is by means of special steel clips, which grip the various members without piercing them, a form of construction which has the further advantage that it facilitates replacement in case of fracture.

Attachment of the wings to the *fuselage* is by means of similar steel clips so designed that it is possible to

Wing spars as well as interplane struts are, like the *fuselage*, made of steel tubes, the struts, needless to say, being of streamline section, and bracing is effected by means of stranded steel cables. The engine, in the case of the stationary motor, is mounted on stout ash bearers supported from the *longerons* of the *fuselage*, while in the machine designed for a rotary engine the bearers are more or less of a similar type to that employed on British machines.

Although being made of steel throughout, the Otto biplane is said to be lighter than one of the same size made of wood, and the factor of safety in the wings is stated by the makers to be 8.

A chassis of the usual simple type found in the majority of German military machines is fitted, the material used being streamline steel tubes for the struts and a tubular axle slung by rubber bands. Quickly detachable steel



TWO VIEWS OF THE OTTO ALL-STEEL FUSELAGES.—On the right, the nose of the body and chassis of the machine fitted with a stationary engine, and on the left the nose of the biplane with a rotary motor.

slide the wings a short distance along the *longerons* so that a heavier or lighter engine may be fitted and the balance of the machine preserved by shifting the wings slightly backwards and forwards. In addition to this adjustment the angle of incidence can be altered to suit various purposes. In the machines shown both these adjustments are carried out when erecting the machine, but, according to information available, later types will be fitted with the necessary levers for carrying out this operation while in the air, an improvement that has no doubt been rendered effective by this time.



German Aircraft Attacks on Shipping.

In the "Wireless" news sent out from Berlin on Monday there was the following:—

"The English steamer 'Cotterel' was fired at and bombarded by two German aeroplanes near the Noordhinder Lightship. The steamer was damaged."

A Derelict German Balloon.

INFORMATION was received in Amsterdam from Middelburg

clips secure the chassis struts to the lower *longerons* of the *fuselage*, and the chassis can, like the wings, be moved slightly backwards and forwards to obtain perfect balance on the ground for engines of different weight.

The older machines were fitted with 100 h.p. Mercedes engines, but in view of the exceptional facilities for changing over, it appears highly probable that the latest ones have engines of 150 h.p. or more, which, in conjunction with the variable angle of incidence, should give a machine of more than ordinary utility.



on Tuesday that a small German captive balloon had fallen to the ground near Biggekerke, in the province of Zeeland, and had been confiscated by the Dutch military authorities.

An Aerial Torpedo Timer.

It is reported from New York that Mr. Hudson Maxim, who is a member of the U.S. Naval Advisory Board for inventions, has placed before the authorities a new device for timing the explosion of torpedoes released from aircraft.



How do all the irresponsible stories and rumours get into the papers nowadays? The worst of it is that many of them are a source of considerable annoyance and mischief in directions little thought of by the originators in spreading them. Only the week before last, by way of instance, a reference was made in a contemporary to the untimely death of the late Second Lieut. M. L. Braithwaite, R.F.C., it being stated that Mr. Braithwaite was killed in landing, owing to engine failure "*when flying to lunch with some friends near Paris.*" Such a suggestion is most offensive in many respects. The facts of the case are as follows, and these come from one who *knows*:—

Second Lieut. Braithwaite was flying a new Caudron machine from the aerodrome at Buc to the aerodrome at Juvisy. The machine landed very fast in a field, ran into a mound of earth, the pilot was thrown out on to his head, and died from the result of his injuries the next morning. Lieut. Braithwaite was on duty, and the accident occurred at 5 o'clock in the afternoon, so that he was hardly flying to lunch with friends at that hour of the day.

x x x

A very welcome visitor dropped in upon us on Monday in the person of Adjutant-Aviateur Louis Noel, who has been spending a goodly part of a none too long leave of absence with his friends on this side. Except for the becoming uniform and the numerous decorations on his breast, Noel is very much like his old self, and to all outward appearances at any rate he looks none the worse

for his long period of strenuous work at the front. Glad as *we* all were to see him, I think he was equally pleased to be once again in intimate touch with his many friends over here.

x x x

As far as the present restrictions allow publicity his doings have been followed with keen interest, although little has transpired by reason of his disinclination to speak of himself. But enough is known for us to wish that his good luck may hold out to the end of this gigantic struggle. He is one of the real good sort is Louis Noel.

x x x

Regarding that other old-time Hendonian Pierre Verrier, I was glad to learn from Noel that he is again going strong. The injuries to his leg have not, perhaps, left him quite as energetic as he was before, so that he is no longer at the front. He is, however, doing "his little bit" all the same, for he is kept very busy testing new Farmans, a task that is equally as needful for France and her Allies. May *his* shadow never grow less.

x x x

During Noel's visit to Hendon on Saturday, he had an opportunity of admiring some of the new British machines that have sprung into existence since he left for France at the beginning of the war. Most interesting among these was, perhaps, that of the unknown pilot who, I hear, appeared suddenly from nowhere in particular, circled the aerodrome a few times, executed a succession of loops of a most extraordinary character, and disappeared as suddenly as he came, nobody knew whither.



A group of Staff Officers with the German Emperor. The Kaiser is seen with uplifted hand in front—towards the Standard. It has been suggested that it may have been the occasion of the "*Meinself und Gott*" appeal which appeared on page 704 of "*FLIGHT*" recently. To the left of the photograph, in the lower group, is seen Count Zeppelin (with despatch in his belt).

Who the stranger was I am not in a position to tell, as I did not happen to be at Hendon at the time, but from the descriptions of the machine and the astounding speed at which she was apparently travelling, I am inclined to hazard the opinion that it was none other than our old friend Harold Barnwell on a Vickers scout. Still, not having been there myself, I cannot guarantee the accuracy of this surmise. But it was "some" scout without a "possible probable doubt."

x x x

Reference was made in "Eddies" some time ago to the "baby" aerodrome acquired by the London and Provincial Aviation Co., just outside the Hendon aerodrome. I now learn from Mr. Warren that he has purchased a shed which he intends to erect on this tract of land, and in which will be housed the lower-powered school machines used for rolling practice, "straights," &c. There will thus be no necessity for the instructors to hop over the fence with these 'buses before and after a day's work. The higher-powered biplanes used for circuits and *brevet* tests will be kept in the old sheds inside the aerodrome.

x x x

One of our well-known aeroplane designers is just now coming in for a good deal of "ragging," not, in this case, because he has not been successful with his design. On the contrary, his machine is a source of envy to many rival designers. It is like this: The 'bus in question is quite a "sparklet"; actual figures being "verboten," I will take some absurd figure and say that the machine does 199 m.p.h., and our designer friend is worried to death because he cannot by any manner of persuasion get her to do the odd m.p.h.

x x x

How time does fly! I wonder how many readers of "FLIGHT" realise that we have passed the twenty-fifth anniversary of the first observed man-controlled free flight. It had gone clean out of *my* mind until I happened to come across a little paragraph in our excellent French contemporary, *l'Aérophile*. It was on the 9th of October, 1890, that Clément Ader succeeded in getting his first machine, *l'Eole*, to do a short flight. Nothing more than a hop, to be sure; but still it is claimed that he *did* get off the ground. A long space elapsed between this first flight and the real flights led by the Wright Brothers, and followed by the Voisins, Farmans, Santos Dumont, Blériot, and Robert Esnault Pelterie; but from the days when these pioneers demonstrated the utility of the aeroplane and up to the present day, the development of aircraft has been one of progression without precedent. Wonder what surprises the *next* twenty-five years will bring.

x x x

Although little is heard of the doings of the French "lighter than air" fleet, these craft are doing a very considerable amount of good work by carrying out bombing expeditions to points of military importance behind the German lines. Railway stations and junctions, ammunition stores, and transports, &c., have frequently suffered heavily from visits by these mobile French *aéronefs*. Taking into account the frequent trips over territory that is bristling with guns of all descriptions, the losses incurred have been small, in proportion to the damage inflicted. Occasionally a dirigible is "strafed" somewhat severely, it is true, but it is happily an exception for the Germans to bring one down.

In the early part of last month, however, the French acknowledged the loss of one of these dirigibles, the *Alsace*, a fact which has already appeared in these pages. From further details to hand, it would seem this little airship had a few days previously successfully bombed the junction Amagne-Lucquy, and the stations at Attigny and Vouziers. It was on that occasion subjected to a violent fire from the anti-aircraft guns, but returned to its base without having been seriously damaged. A couple of days later the *Alsace* started again on a bombing expedition, from which she did not return. According to the German *Vossische Zeitung*, it was brought down at Rethel and the crew made prisoners. The passage in the German paper reads: "Towards 6 o'clock in the evening the dirigible was seen to the south of Rethel; after being fired at for some time, it was seen to catch fire in the centre of the *nacelle* and descended slowly. When still some distance from the ground three of the eight occupants that constituted the crew jumped overboard, one of whom was killed. Later the other five, of whom three were officers, jumped out without receiving any injury. After wandering about all night they were captured the next morning. The *Alsace* fell in the trees between the villages Perthes, Châtelet, and Tagnon."

x x x

Some of the new German biplanes seem to be good climbers according to reports in German aeronautical journals. Recently at the Rotthausen aerodrome a Condor biplane is said to have reached a height of 3,280 metres (about 10,760 ft.) with four passengers. That this should be claimed by the Germans as a world's record is, however, somewhat remarkable, especially as the same journal that publishes the report gives in its table of world's records the altitude reached by Garaix on the Paul Schmitt with four passengers as 3,300 metres.

x x x

A propos German aeroplanes. Some of the manufacturers are evidently doing rather well over the war. The well-known Hansa Aircraft Works of Berlin, founded by the aviator Caspar, have increased their capital from 350,000 Marks to 1,500,000 Marks, while changing the title to the equivalent for The Hansa and Brandenburgish Aircraft Works. Another item of prosperity is that the Gothaer Waggonfabrik at a meeting of the shareholders decided to pay a dividend of 12 per cent.

"ÆOLUS."



French prisoners at a German air station.

CORRESPONDENCE.

The Demarcation Line between Science and Art.

[1910] "The Dreamer's" arrival as an artist is somewhat belated. Nevertheless his article on the artistry of flying was wanted, for although I have alluded to the same topic for many years in the lay Press, the technical papers have somehow refused to give me a hearing. Flying is undoubtedly an art. Ever since I first saw a graceful turn in the air I refused to believe that flying could be anything else. When I enjoyed my first personal experience of an artistic bank I became still more enthusiastic in the cause of flying as an art. But I am afraid "The Dreamer" is trying to remove a mountain. I have tried, and in consequence been ridiculed and snubbed, although I confess with pride to the conversion of a few individuals, who gave in to me perhaps by reason of pity. When your contributor says that the majority of pilots disagree with the art theory, he forgets that many aviators are artists unconsciously. A pilot who can loop the loop and perform other evolutions artistically must necessarily possess the artistic temperament, if only in a small degree. The root is there, and it merely wants cultivating. The instance of the automatic piano-player is an excellent example. I have one, and a few aviators have used it. I could always tell which had the soul or the art, and, strange to relate, the artistic users were in my humble opinion the best exponents of flight. For obvious reasons I cannot mention names. One critic recently took me to task in a well-known paper. He argued that flying was a question of efficiency. Now in aeroplane construction efficiency is a prime factor, but in aeroplane piloting it is often intuition that counts. A man may be efficient, but he is not necessarily artistic because of his efficiency. I am afraid, as I said before, that "The Dreamer" has undertaken a heavy task, but his interesting article may call forth a few opinions besides those of

CLARENCE WINCHESTER ("ORNIS").

London Aerodrome, November 7th.

[1911] I was interested in your "Dreamer's" article in last week's "FLIGHT" on the art or science of flying, and whilst I agree with him up to a point, it does seem to me that he is somewhat inclined to stretch the art side of the business. Allowing, as he says, that science teaches us to know, and art to do, this could be applied to almost everything. I admit that an aeroplane will not fly entirely alone, because it has no sense of direction, but there can be no great art in ruddering with the left foot when the pilot wants to turn that way, and it is science which causes the machine to turn. A mechanical road-sweeper is a scientific machine although it cannot sweep a road unaided, yet surely there is not much art in driving the horse that pulls it. My opinion is that flying is science pure and simple, and the best flyers are those who have learned most scientifically and can apply their knowledge according to their requirements. There was, I believe, a short time ago, a dirigible which could be controlled by wireless, and made to do anything. Why should not something of the kind be one day used in the case of an aeroplane? Surely there is no art in pressing buttons!

Willesden Green.

ONE INTERESTED IN FLYING.

Inventors and the Defence of the Realm Act.

[1912] A new Order in Council under the Defence of the Realm Consolidation Act, 1914, and dated the 18th October, 1915, is of such importance to inventors and applicants for patents that I venture to encroach on your valuable space to bring this before your readers.

By this new Order the following new regulation has been promulgated:—

"18B.—1. Where an application has been made, whether before or after the date of the making of this Order, for the grant of a patent or the registration of a design in the United Kingdom, and the Comptroller-General of Patents, Designs and Trade Marks is satisfied that the publication of the invention or design might be detrimental to the public safety or the defence of the Realm or might otherwise assist the enemy or endanger the successful prosecution of the war, he may delay the acceptance of the complete specification filed with the application for the patent, or, as the case may be, the registration of the design, and in such case may by Order prohibit—

a. The publication or communication in any way of the invention or design;

b. Application being made for the protection of the invention or design in any enemy or neutral country; and

c. Application being made for the protection of the invention or design in any allied country or in any of His Majesty's Dominions without the permission of the Admiralty and Army Council.

2. No person shall apply for the grant of a patent in respect of any invention or the registration of a design in any foreign country, or in any of His Majesty's Dominions, unless he has left at, or sent

by post to, the Patent Office, a notice of his intention, together with a Provisional Specification describing the nature of the invention, or, as the case may be, a representation or specimen of the design, nor until after the expiration of one month from the time when such notice was given, and if during the said month the Comptroller-General is satisfied that the publication of the invention or design might be detrimental to the public safety or the Defence of the Realm, or otherwise assist the enemy or endanger the successful prosecution of the War, he may make a like Order as in respect of cases in which application is made for the grant of a patent or the registration of a design in the United Kingdom.

3. Before exercising any of his powers under this Regulation as respects any matter the Comptroller-General shall consult with the Admiralty and Army Council, and shall not act except upon the request of the Admiralty or Army Council.

4. If any person contravenes the provisions of this Regulation, or of any Order made thereunder, he shall be guilty of an offence against these Regulations."

It will be seen that the essence of this new Regulation is to prevent publication of an invention which might be detrimental to the public safety or might assist the enemy or endanger the successful prosecution of the War.

Under the first part of the Regulation the acceptance of a complete specification of an application for a Patent—for, say, a munition of war—may be delayed, presumably until the termination of the War, and an order may be made either prohibiting the publication or communication of the invention or design in any way or prohibiting an application for protection of the invention or design being made in any country.

This is an extremely dramatic regulation, and appears to us to be a gross interference with the liberty of a subject.

The Patents and Designs Act of 1907 provides for the Crown acquiring any protected invention and keeping same secret if it is required by the non-publication of the complete specification of the application for Letters Patent, and therefore it is only reasonable to assume that the present Regulation is intended to apply to inventions which the Crown does not propose to acquire.

It appears to us that the effect of this new regulation is not only to give the Crown a monopoly in a very large class of inventions, but also to make the commercial value of such inventions nil if they are not acquired by the Crown.

It is obvious that if the acceptance of a complete specification of an application is delayed and an Order is made prohibiting the applicant from filing an application abroad, and such Order is not withdrawn before the expiration of twelve months from the date of the application in this country, the inventor will lose his rights under the International Convention, and, what is more important, will be prevented from recovering damages for infringement which may extend over a very long and important term. To take a concrete case. Supposing the inventor of a useful hand grenade has applied for a patent in this country, and the acceptance of the complete specification has been delayed until after the war under this regulation, and supposing that a third party has acquired knowledge of the invention and puts it into practice and has offered to supply same to the War Office and has obtained a contract. Neither the third party as manufacturer nor the Crown as user would be liable for damages for infringement until the complete specification of the application had been accepted after the termination of the war.

Under the second part of the Regulation it is quite clear that if an application is made for permission to file an application abroad for an invention forming the subject-matter of an application in this country the acceptance of the complete specification of which is held up, such permission will be refused.

ROBERT E. PHILLIPS.

70, Chancery Lane, London, W.C.,

November 8th, 1915.

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An Aerial Duel Over the North Sea.

INFORMATION has been received by the *Telegraph* from the Belgian frontier to the effect that on November 5th, at 3.30 p.m., a duel took place over the North Sea, near Heyst, between a German and an Allies' aeroplane. Owing to the powerful wind both aeroplanes were badly shaken. The engagement lasted only a short time, the German making off and being pursued until he had nearly reached the coast. The Germans then directed anti-aircraft guns on the Allies' aeroplane, which, however, turned and safely got away.

Four Killed in Aerial Collision.

A MESSAGE from Paris on the 4th inst. stated that while two military aeroplanes were landing near Le Bourget they collided. The four aviators on the machines were burnt to death.

THE "ARRIVAL" OF THE AEROPLANE.

By ALGERNON E. BERRIMAN, M.I.A.E., A.F.Aë.S., Chief Engineer of the Daimler Co., Coventry, England.

(Continued from page 861).

Stream Line Forms.

THEORETICALLY, it can be shown that obstructions of fish-like or torpedo shape should experience a resistance that is wholly frictional by nature; that is to say, their bulk when thus enclosed by a surface of suitable contour should not give rise to any of the resistance that would be occasioned by the exposure of its flat cross section.* Such shapes are commonly called stream-line.† Actually, the result of tests on many different models shows that while the character of their resistances approximates to the friction law, their coefficients always exceed Zahn's constant for a truly flat surface.

STREAM LINES OF FLUID FLOW.

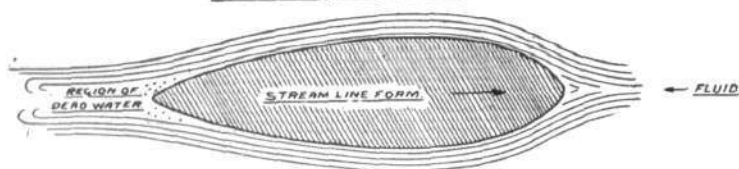


Fig. 1.—Diagram illustrating the nature of the fluid flow round a streamline form in motion. The region of dead water behind the tail end of the streamline form is indicated.

It appears from the photographic observation of fluid flow around model stream-line forms that the stream-line flow discontinues its adherence to the contour of the figure as it approaches the tail end of the model.‡ In the immediate vicinity of the tail there is thus a surface of discontinuity§ enclosing a region of dead water and turbulence, which condition necessarily augments the resistance. See Fig. 1. For this reason, it has been suggested that the nature of the resistance of stream-line forms should properly be regarded as dual; that is to say, partly conforming to the law of surface friction, and partly conforming to the v^2 law appropriate to normal surfaces. Apparently, however, the assumption of the frictional law for stream-line forms approximates to the truth sufficiently for practical purposes, provided that the coefficient appropriate to any particular form is determined by experiment. No single value of the coefficient obtains for any variety of shapes, but the ratio of the flat-plate coefficient, determined by Zahn, to the stream-line coefficient, determined in respect to a number of different models that have been tested, is in the order of 1 : 2.

Assuming this to hold good for some imaginary case, and approximating the exposed surface of a stream-line body in terms of a cylinder πDL (where D = diameter and L = length) we get a ratio of surface/section = $4L/D$, from which we may obtain a rough idea of the kind of fundamental relationship that might be expected to exist between the resistance of a stream-line form and the face resistance of its sectional area.

Thus, in the example previously cited, a ratio of resistances of 300 : 1 was established in respect to single-face and double flat-surface resistance. In a stream-line body, only the outside surface is in contact with the air, but if, as has been suggested, its coefficient of resistance is twice the flat surface, then the above ratio of 300 : 1 may be allowed to stand. We thus obtain :

$$\begin{aligned} \text{Ratio of areas} &= \frac{\text{Surface}}{\text{section}} = \frac{L}{4D} \\ \text{Ratio of resistances} &= \frac{\text{unit surface}}{\text{unit section}} = 300 \\ \text{Ratio of resistances} &= \frac{\text{whole surface}}{\text{whole section}} = \frac{4L}{300D} \end{aligned}$$

Or, for a particular case in which the ratio of length to diameter is, for example, 7.5, the resistance of a stream-line body might be expected to be about one tenth the resistance of its cross sectional area exposed as a flat plate.

Actually, the resistances of stream-line bodies are of this order of magnitude, although varying widely among themselves. The best results thus far recorded at the National Physical Laboratory show a particular form with a ratio of length to diameter of 4 : 1, which offered 0.07 times the resistance of its cross sectional area regarded as a flat plate.

* For proof, see Lanchester's "Aerodynamics," 3rd edition, section 9.

† Lanchester's definition is as follows: "A stream-line body is one that in its motion through a fluid does not give rise to a surface of discontinuity." "Aerodynamics," 3rd edition, section 23.

‡ For an illustrated account of these experiments see the "Technical Report of the Advisory Committee for Aeronautics," 1911-12, page 95.

§ For a general discussion on discontinuous motion, see Lanchester's "Aerodynamics," 3rd edition, section 23.

The above particular citations, incomplete as they are, suffice to indicate the enormous importance of the subject—an importance that has already become a predominating influence where modern aeroplane design is based on scientific research. In the aeroplane of to-day, every effort is made to profit by these lessons. The engine, the pilot, and the passenger are placed in tandem, and, as far as possible, the body of the machine is streamlined round them. Most of the struts in biplane construction are made of timber and are rough-turned to stream-line section on a copying lathe, being afterwards finished to gauge size on a sand belt. With steel tubes, a few oval sections are already on the market and are suitable for some purposes, but in many cases circular-section tubes are fitted with light aluminium or wooden fairings, in order to convert their exterior surface into streamline form.

Leaving aside the question of stability, which must necessarily be discussed separately, it is in the above-mentioned direction that aeroplane design has shown the most notable improvement of late years. Success in this department really resolves itself into a capacity for taking infinite pains, and certainly the Royal Aircraft Factory, where this class of design has predominated, has shown great consistency of purpose in its efforts to reduce the resistance of its machines.

National Research and Private Enterprise.

At this point, it may perhaps be best if I digress for a moment in order to explain the position of the Royal Aircraft Factory and its importance to the country at the present time.

For the past six years, the official development of scientific aeronautics in Great Britain has been directed by an Advisory Committee appointed by the Prime Minister. Its President is Lord Rayleigh, its Chairman is Dr. Glazebrook. The formation of this Committee was an accomplishment for which the Government deserves much credit from the world at large, for the Technical Reports of this Committee constitute an unrivalled source of reliable information that might otherwise have taken half a century or more to have seen the light in its present lucid form.

The research itself, which the Advisory Committee directs, takes place at the National Physical Laboratory and at the Royal Aircraft Factory. In the Aeronautics Branch of the National Physical Laboratory the experiments are all conducted on small scale models. At the R.A.F.—an institution evolved from the old Military Balloon Factory, and now under civilian control, with Mr. Mervyn O'Gorman, C.B., as the Superintendent—the experiments are life size. Besides these two Experimental Departments, which are given over to aeronautical research, there is the invaluable work in meteorology, which is conducted partly under the direct control of the Committee and partly under the direction of the Meteorological Office. The reports of this section are also embodied in the annual Blue Books.

It must not be supposed for a moment that the development of private enterprise in aeroplane construction, nor the practice of the art of flying has waited upon the work of the Advisory Committee, the N.P.L., or the R.A.F. On the contrary, it is to such sportsmen as the Wrights in America; Farman, Delagrange and Blériot in France, A. V. Roe and S. F. Cody in England that the flying machine first learned to walk, so to speak, in its proper element.¶ They had few text-books**—and they wrote none.

The Work of the Wings.

I will now revert to the subject of aeroplane resistance, and discuss as briefly as may be the part of it that is due to the wings. Hitherto, I have referred only to the resistances of struts, wires, body, etc., in short, to the many and various constructional features inseparable from the design of a useful machine. These, nevertheless, play no part in the wing structure proper. In the aggregate, these various resistances are commonly referred to as the "body resistance." No matter what their precise nature, they all increase as the square of the speed,†† and the significance of reducing that due to even one

¶ The circular section itself offers a very high resistance, owing to the surface of discontinuity commencing practically at the full diameter.

¶ For the history of the development of the aeroplane and the work of the pioneers, see "Aviation," p. 172, et seq.

¶ For a fuller account of the work of Cayley, Wenham, Walker, Lana, Pilcher, Stringfellow, and Borelli, see "The Aeronautical Classics," published by the Aeronautical Society.

¶ For original articles on their own work by Lilienthal, Chanute, Maxim, Pilcher and Langley, see Means' "Epitome of the Aeronautical Annual."

** The earliest publication that can claim to be regarded as a really scientific text-book was Lanchester's "Aerial Flight," the first volume of which, called "Aerodynamics," appeared in 1907, and is only beginning to-day to be appreciated in the way it deserves.

†† Approximately. See previous notes on the " v^2 " law, and the laws of dynamical similarity.

item becomes, therefore, immensely important with machines intended for high velocity. When aeroplanes were designed to fly at about 40 miles an hour, body resistance was not of very much account. Pilots sat in exposed positions and struts were of any convenient section. Now, however, when they are expected to fly at 80 miles an hour or more, the principles making for the reduction of resistance need to be applied to the very smallest item.

The situation presented by the wings of an aeroplane is altogether different; their resistance is roughly independent of speed. By this I do not mean that one and the same wing offers the same resistance at all speeds, but that the resistance to the support of a given load could be the same at all speeds if the wings were suitably designed for their respective speeds in the first instance.*

The nature of the resistance of a wing in flight is itself of two kinds. In the first place, its lifting effort is derived from the reaction of the stratum of air that is accelerated downwards as the wing passes through the atmosphere; and, in the second place, there is the frictional resistance of the air rubbing on the wing surface.

Flying at a constant attitude, as represented by the angle of its chord to the relative wind, the lift of any given wing increases as the square of the speed;† consequently, for a given total load to be supported, the wing area required diminishes as the square of the speed. That is to say, a machine designed to fly twice as fast as another will carry the same load on a wing area of one-quarter the extent: *Vice versa*, if the speed of one machine is half that of another, it will need four times the wing area for its support. In each case the weight is, of course, the whole load, including machine, pilot, and fuel.

So far as this aerodynamic resistance is concerned, it is directly proportional to the intensity of the lift per unit surface, and, therefore, remains constant for a constant load, if the wing area is adjusted to the square of the speed. Similarly, in the case of the frictional resistance, this increases roughly as the square, and therefore remains nearly constant if the wing area is adjusted to the square of the speed. On these premises the combined resistances of the wing remain constant, but actually the difference between Zahn's law for skin friction and the " v^2 " law is, it will be noticed, appreciably in favour of fast flight, and the same remark also applies to the effects of high speed on the lift coefficient.

There is another way of adjusting the lift of a wing to suit its flight speed, which is by altering its attitude. When the angle is steeper, the lift is increased; but, by this method, the resistance with a constant load varies widely.‡ (See Fig. 2.)

It was pointed out by Lanchester§ that since the aerodynamic resistance increases with the angle, whereas the frictional resistance is independent thereof, there must be a particular relationship between these two factors making for greatest economy. He also showed that this angle of least resistance obtains when the aerodynamic resistance is equal to the frictional resistance. Consequently for a given medium (*e.g.*, the atmosphere) and a given surface (*e.g.*, varnished fabric) there is, theoretically, a common angle of least resistance representing the attitude in which all wings might be set for greatest economy.||

The Regulation of Speed.

The particular interest of this deduction has proved to be rather academic than practical, inasmuch as aeroplanes must be designed to be capable of a wide speed range for the sake of safe landing, and no better method of regulating speed in flight has yet been devised than by altering the attitude of the machine by means of the elevator. This organ of control is commonly in the form of a hinged flap extension to the tail.

* See Lanchester's "Aerodynamics," 3rd edition, section 166.

† For convenience, I ignore the inaccuracy of the " v^2 " law, as it is sufficiently true to cover moderate speed ranges without serious error, and its assumption makes for simplicity of expression in the text.

‡ In order that the results of various investigators should readily be comparable at a glance, it is desirable to express the aerodynamic forces, such as lift and resistance, in terms of an absolute coefficient, the numerical value of which is unaffected by the system of units employed. Thus, assuming the " v^2 " law, the fundamental equation for the lift and the resistance of wings is:

$$\text{Force} = \text{Constant} \times \text{density} \times \text{area} \times \text{velocity}^2$$

$$F = C \times \rho \times A \times v^2$$

It has been shown that the value for C for flat plates ranges from 0.507 to 0.62. For wings the lift coefficient ranges from zero to about 0.6, according to the angle of incidence. The maximum lift occurs at an angle depending on the profile of the section, but is commonly in the neighbourhood of 12° .

At this angle all wing sections experience high resistance, and aeroplanes are, therefore, designed for a much finer flight angle. In the Military Aeroplane Trials, 1912, the lift coefficient calculated from the results (see "Aviation," p. 308) ranged from 0.19 to 0.335.

For converting lift coefficients into pressure in lbs./sq. ft., multiply by 0.00236 v^2 , when v is in ft./secs.

§ See "Aerodynamics," 3rd edition, section 163.

|| Experiments on a range of wing sections tested at the N.P.L. showed a common attitude of least resistance in the neighbourhood of 4° , but the ratio of the lift to the resistance at this angle varied from 10 to nearly 15, according to the section. For a particular flat plate, the lift/resistance ratio was found to be about 12.

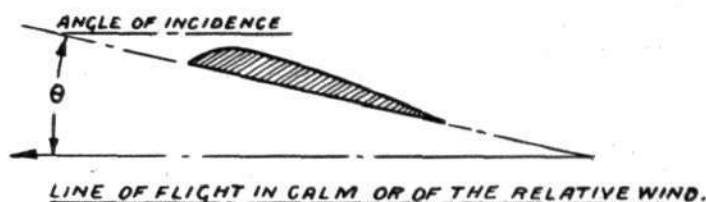
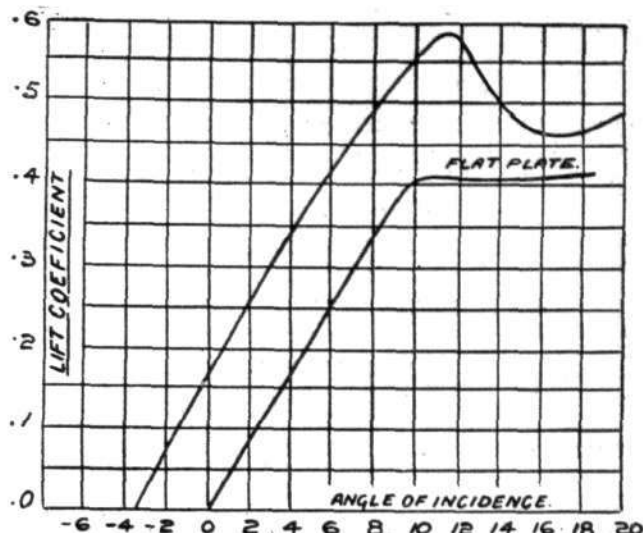
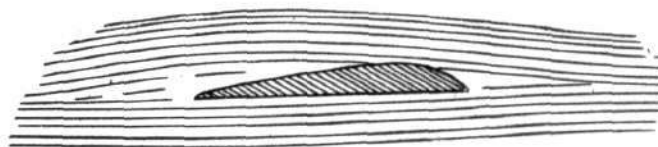
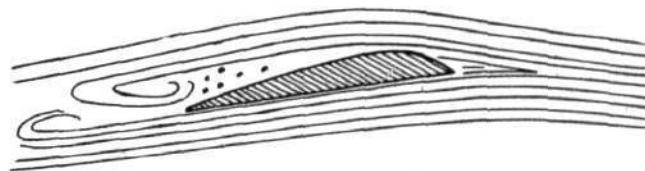


Fig. 2.—Diagram illustrating a typical example of the relationship between the lift of an aeroplane wing and the angle at which it flies. The sudden drop in the lift after the critical angle is very pronounced in the particular wing section from which the curve has been plotted. It is almost absent in the case of a flat plate. In order to convert the lift coefficient into pressure in lbs. per sq. ft., multiply by $0.0051 V^2$, where V is the flight speed in miles per hour.

When the elevator is moved, the effect is to increase or decrease the air pressure on the tail, which disturbs the longitudinal balance of the machine and causes the aeroplane to take up a new attitude of equilibrium. This bodily tilting of the machine results, of course, in altering the angle of the wings to the relative wind, so that their lifting effort at any given speed is increased or decreased, as the case may be.



CHARACTERISTIC FLOW AT FINE ANGLE.



CHARACTERISTIC FLOW AT STEEP ANGLE

Fig. 3.—Diagram illustrating examples of the characteristic fluid flow round aeroplane wing sections. These diagrams are drawn from photographs appearing in the Technical Report of the Advisory Committee. They naturally cannot convey such a clear idea of the nature of the flow as is conveyed by a photograph. The breakdown of the streamline flow, when the wing is at a steep angle of incidence, is the important point illustrated by the above comparison.

If it is desired to fly more slowly, the pilot adjusts the elevator so as to depress the tail, and thereby increase the angle of the wings. When this tail-down attitude is very pronounced, the machine is said to be flying *cabré*, and is in a state that experience, also theory, shows to be fraught with great danger.

This is due to the fact that the characteristic increase of lift with increase of angle suddenly ceases when the angle attains 12°, or thereabouts, and is followed more or less immediately by rapid decrease of lift if the angle of the wing is still further increased. (See Fig. 2.) The precise value of this critical angle depends on the profile of the wing section, and must be determined experimentally.*

Generally speaking, the drop in lift beyond the critical angle is more pronounced with wings of great camber than with those that are relatively flat. In the flat plate, indeed, it is scarcely noticeable, although the cessation of the increase occurs with equal abruptness.

It is very evident that a pilot may readily precipitate an accident if he tries to force his machine to fly *cabré*, and not a few deaths have been due to this cause. It is, indeed, mainly in order to avoid this class of accident that careful pilots never leave the precincts of the flying ground before they have satisfied themselves, by climbing to several hundred feet altitude, that the engine is in good condition. Flying at a great height is, in any case, the best safeguard against being caught out in emergency.

* For diagrams see the "Technical Report of the Advisory Committee," Vol. 1911-12, p. 60.

If the engine power weakens, and finally ceases, it is inevitable that the pilot must point the nose of his machine earthwards for a dive, in order to recover his flight speed by the assistance of gravity. This is, obviously, a dangerous manoeuvre in the vicinity of the earth. Moreover, a pilot flying at a great height has a wider choice of landing ground.

The cause of the sudden change in the characteristic lift of aeroplane wings is due to a more or less complete breakdown of the regular air flow along the top of the wing surface. At small angles of incidence, the flow is streamline in character and conforms to the wing profile. At steeper attitudes, the wing acts more as a barrier, and the main stream breaks away from the wing and thereby forms what is called a surface of discontinuity. Between the main flow of the air and the surface of the wing, a region of dead-water is thus established. (See Fig. 3.)

This also gives rise to a sudden increase in resistance, so that if the act of flying *cabré* is due, as is usually the case, to a faulty engine, the danger is speedily augmented.

The cause of the increase in resistance is equally due to the breakdown in the air flow over the wing and the spreading of the region of dead-water over the upper surface. Being comparatively quiescent, this region is at a practically uniform pressure, and destroys the most important quality possessed by the cambered wing, viz., the inequality of its pressure distribution.

(To be continued.)

A PERMANENT SOLDER FOR ALUMINIUM.

PERHAPS one of the reasons why aluminium, or its alloys, are not used as extensively as one would suppose they would, considering their comparative lightness and strength, is because of the difficulties that have been experienced in the process of soldering. Many have been the attempts to produce a solder for aluminium or its alloys comparable with those used for other metals, and it must be admitted that the general results have not entirely convinced the average constructor that reliance can be placed upon aluminium soldered work. The action of the atmosphere, water and temperature causing electrolysis or rapid corrosion of the solder is one of the chief troubles, whilst the difficulty of thoroughly uniting the solder and the metal, through the rapid oxidation of the surfaces, is another. A few days ago we witnessed a demonstration of a new aluminium solder, "Kaylon"—new, that is, inasmuch that it has only just been put on the market by Messrs. G. T. Riches and Co., Ltd., of 19, Store Street, Tottenham Court Road, London, W.C., but we understand that the inventors of "Kaylon" have been carrying out extensive trials for several years. That "Kaylon" is non-electrolysing was shown by immersing in boiling water two pieces of aluminium, one tinned with ordinary aluminium solder and the other with "Kaylon." In the first case a strong action immediately took place, a large quantity of gas being given off, but in the second case there was no visible action at all. No flux is required with "Kaylon," and the method of soldering is very simple. The parts

to be united are first thoroughly scraped, to remove the skin of oxide always present on the surface even of new material. If the parts are greasy, as in the case of a crank case, &c., they must be heated until all the oil is charred out before scraping. After the parts have been well scraped, they are heated until the solder will just melt on the surface without flowing too freely—the solder tins best in a semi-fluid condition. The solder is then rubbed well into the metal with a special wire brush until the surfaces are thoroughly tinned with a coating of "Kaylon." More solder is then applied, and the parts heated until the solder is perfectly fluid, and, skimming the surface with the brush, the parts are laid together in position and clamped down until the job is cold. The use of a copper bit with "Kaylon" is not recommended, the steel brush being more effective, cleaner and quicker. Even when the metal has been scraped clean, a film of oxide forms immediately heat is applied, but the working of the steel brush scrapes this away and allows the solder to come in contact with pure metal. When soldering aluminium to other metals such as copper, a flux may be used for tinning the copper with "Kaylon," but it is essential that all traces of flux and grease be removed before uniting to the aluminium. We understand that the Government, after testing the capabilities of "Kaylon," have placed an order with the makers. It is also being used by one or two important aircraft manufacturers. Further particulars and prices may be had from Messrs. G. T. Riches.

Airship Building in Germany.

WE give below an interesting message from Mr. Leonard Spray, published in the *Daily Telegraph* of the 10th inst., which states that Germany is enlarging her airship fleet with all speed. The story comes from Rotterdam, and it reads like many another which Germany has exported through neutral countries, and no doubt its main object is not so much what it says but what it is hoped will be read into it by unthinking persons. Mr. Leonard Spray writes:—

"At a score or more places in Germany the construction of Zeppelins is being carried out. This information comes to me from an absolutely reliable source. In a position to obtain definite news on the matter my informant added, 'I can safely say that in no department of constructional work in Germany at the present moment is there greater activity than in this one. Not only has the plant been greatly increased, but everywhere they are working with nothing less than feverish haste.'

"This is no mere hearsay. For some reason, difficult as it may be to probe, the truth is that the enemy is just now devoting more attention to the strengthening of his airship squadrons than to anything else. This policy is not confined to the Zeppelin type. As fast as they can be built, there are being turned out also dirigibles of the classes bearing the names of their inventors, Major Parseval and Professor Schutte. Simultaneously with the construction of the airships themselves, sheds are being erected. In this connection there are two new features. Instead of concentrating these

buildings in such well-known centres as Wilhelmshaven, Hamburg, and so on, sites have been chosen at an extraordinarily large number of places in widely separated localities in Germany. The other change is in the material used in these sheds. Instead of constructing them almost entirely of wood, as, for instance, those destroyed by the incendiary bombs of Allies' aviators in Belgium, so far as possible iron only is being used, not only for the framework, but also for the roofing. Still another development is the designing of portable sheds—a matter which is in the hands of Krupp's.

"Naturally, the question arises, What is the object of this activity entailing as it does a vast expenditure of energy, of human labour, and of money, for all of which, it might be thought, Germany could find more useful employment at the present time. What military purpose has so far been achieved by the use of airships is known only, if it exists at all, in the minds of the German General Staff. All the evidence points to practically absolutely negligible results from this point of view."

Mr. Spray goes on to indicate that probably it is hoped now that the submarine war on merchant shipping is admitted to be a failure that the Zeppelins will be the means of influencing the British indirectly to think about the desirability of peace. This is borne out by a statement by Capt. Persius, at the end of an article boasting of the deeds of German naval aircraft:—

"Airships are useful to undermine the feeling of security in any country, to destroy harbour works, and so on, and to threaten mercantile shipping."

THE WORK OF THE BALLOONS.

Another of the very interesting pen pictures of life at the front, contributed by Mr. H. F. Prevost Battersby to the Morning Post, which is reproduced below, gives a vivid impression of the part played in artillery work by the observation balloons, a phase of military aeronautics which has assumed great importance during the siege warfare which is now in progress in the North of France.

There are two zones to be noted in the battle line. One lies between the opposing front trenches. It is an irregular breadth, sometimes narrowing to a score of yards, sometimes widening to three or four hundred. In that zone only the dead lie and the dying. The other zone is much wider and less irregular. It is bounded by the two lines of anchored balloons. They are not really anchored, only moored, and their moorings are moveable, and make a habit of moving. But the movement makes little difference in the general direction of these ungainly sentinels, so that they appear to occupy the same positions, each distant something over a rifle shot from the other, and from two to three miles behind the front line of trenches, forming a dotted line, which runs, roughly, parallel to the real front. Between these two dotted lines, German and English, there is thus a zone, some six miles wide, in which may be found all the immediate interests of conflict, except the more remotely directing brains, the winged observers, and the big guns that don't need to see what they are shooting at.

In this zone the least dangerous places on an ordinary day are the trenches, save where they lie within bombing range, and even there the general sense of futility often spreads a Sabbath-like calm between the intervals of fury. The gunners, as a rule, leave the trenches alone, knowing that a lot of powder must be spent for a very little blood-spilling, and concentrate their attentions on the half-ruined villages immediately behind the front, counting on the tendency of civilised man to revert to his housekeeping habit, even where the habit may get him into trouble. In this zone, near the centre of a grimy red village, stood the black and forbidding heap of shale from which we hoped to get a view of the enemy. These pit-head heaps are the dreariest feature of a dreary country, and their blackness, towering above the sooty villages, amid long, lean chimneys and mining machinery, produces a sense of prosperous desolation almost worse than that of war. They look high and steep, but when you come to haul yourself to the top of them by the help of a rope you find their loose slopes more exacting than you imagined. These great humps above a level country are, naturally, used by either side to enlarge its range of vision, and those that best serve the purpose have at their summit little sand-bagged tunnels, into which a man can creep and feel fairly secure from splinters; though, if the enemy were to score a direct hit on his enclosure, he would find decent burial under it a hundred feet below.

A Tiny Target.

On that morning the German gunners had been shelling the villages on either side of this particular "Fosse." White shell bursts, mixed with an occasional black one, above the red roofs, giving their broken chimneys an illusion of domesticity, and increasing the air of desolation about the unshelled Fosse. But the Staff officer whom we had picked up to guide us from Divisional Headquarters shook his head. "Oh, they'll spot us probably," he said. It looked such an impossibility on that unbending plain that he was asked how. He nodded at the balloon. But the balloon seemed no sort of an explanation. It looked at that distance about the length of a steel nib, and it appeared incredible that an observer infinitely smaller than the point of a pin could, with glasses, incomparable with anything, make out through a somewhat misty air the progress of three cars across the flat fields and among the ruined houses, or, if he did make them out, draw from their progress any useful conclusions.

LIGHTER THAN AIR.

Peru Reducing Army.

LIMA, PERU, September 15th.—Following the passage of the law granting political amnesty, the Government is reducing the Peruvian army and paying the passage home of the five men mustered out of the service. But the air service will remain the same!—*Aerial Age*.

LADY (to policeman on duty): "Oh, have you seen the Zeppelin. Which way did it go?"

POLICEMAN (in best official manner): "Up the street opposite, madam, and first turning on the left."—*Punch*.

"WHY Zeppelins Come Here at Will."—*Morning paper headline*.
But they don't come at him; they come from him.—*Punch*.

But the Staff officer still shook his head. "It's extraordinary the things they do see," he told us. We took his word for it, without feeling in the least convinced of their ability on this occasion. It was impossible to conceive that that small smear on the grey sky could be a menace to anything which would appear to it no bigger than a midge, even through powerful glasses. It was true that two of the cars were of the type which has, out here, an important air, being used mostly by people who are sufficiently valuable to need protection from the weather—khaki-coloured affairs with roofs and a good deal of glass, and conveniences within for the spreading of maps and the pencilling of despatches. The party would certainly have appealed as a mark to the German gunner, because, though he might have hurt no one that mattered in a military sense, he could have spent his hate on some distinguished foreigners, who were being taken to the scene of the most serious fighting in which the British Army has ever been engaged.

The way to the Fosse was interesting; everything is in a conflict replete with ever-changing devices for getting the best of it in the long competition of deceptions. Did the Germans know that these guns were here? Rather. But they could not find them. That seemed not surprising, since it was by no means easy to find them when you were within fifty yards of their muzzles. Cunning against cunning! What a contrast to the old straightforward thrust of lance and pike. And the Germans, for all their amazing stupidities, are every whit as cunning as we. Aye, and in their special kind of sharpness they can give points to us.

Enemy Aviators' Fear.

These things can rarely, of course, be seen from balloons; the aeroplanes have to "spot" them, and aeroplaning is not, just at present, for the German an any too confident business. He lives in live fear of finding a British plane above him, and to avoid that he has to rise from the earth at a most uncomfortable hour, so that the dawn may greet him at least ten thousand feet above the sea. From that altitude he sees what he can, and, should he catch sight of an enemy airman, he can plane back, with good chances, behind his own lines. Not a proud rôle, certainly; but better than littering the enemy's gun pits with a mass of wings and engines, to say nothing of himself.

The three cars pulled up in the sordid little street, under the huge mass of the Fosse, and, as their occupants alighted, bang! went a high explosive against the face of the Fosse, on the very path up which they would have been mounting three minutes later. "Local colour!" said the Staff officer, as the black smoke wreathed the front of the heap, and some of the slope of it came clattering down. "Local colour!" may have smiled the German gunner, as he saw the column of dust arise, and put in another shell just above the first in case he had under-estimated the Englishman's activity. It was good shooting, though he had been a trifle out in his timing; but that may have been the fault of the man in the sky, and one looked back at that smear against it with a fresh respect for its activities.

Imagine the unwinking vigilance which, while registering hits in the villages on either side of us, was yet able to interpret the meaning of those three specks moving along the road and signal the exact moment when a shot should be fired, even though those specks had disappeared among the ruined houses. The gunner may have meant to hit the road. The tiniest change in his elevation would have blown the centre car off it. He probably thought he had hit it; he will certainly still think so if he reads this. His gunnery deserves the illusion, and it helped us to understand exactly what the Staff officer said about those eyes in the sky. But he certainly did not cherish the delusion that it could be printed.

THINGS we want to know: Weather or not the Zeppelins will come.—*Star*.

"Terminological Exactitude."

A YOUNG lady was once watching an aviator making some loops and other peculiar things in the air, when she suddenly turned to her paternal relative and said:

"Oh, look, pa; isn't that awfully aeronauty!"

Aerodrome Proverbs.

Look before you loop.

It's a wrong plane that slips in turning.

An aterrissage on land is worth two in the bush.

One good bank deserves another.

MODELS.

MR. R. W. POTTS, a model worker who works on carefully thought out lines and keeps a full record of all his experiments, has sent us the following notes on tuning up a model aeroplane, tractor type, explaining his method of proceeding:—

"1. Having built up the model, place it on a level table and carefully measure the height of each wing tip from the table surface. Adjust them till the measurements are exactly the same, ensuring at the same time that the chassis is perfectly square and rigid with the fuselage. (If the model is a purchased one the position of the main planes should be marked; fasten same securely.)

"2. Measure tail in a similar manner, and adjust till level, at the same time seeing that the skid keeps the tail at least one inch off the table.

"3. See to fin, adjust till it is at right angles with the fuselage, and perfectly square when looking from the tractor.

"4. Lubricate elastic and tractor bearing, adjust elastic taking care that it is not too tight.

"5. Wind up elastic to one row of knots, hold model, see if it stands square, and, still holding model, let tractor revolve.

"6. The model should now be tested in the open air. Choose a smooth piece of ground with plenty of room all round. Place model facing the left of the wind, wind up one row of knots, let model taxi over ground and observe how it runs, adjust fin till the model runs straight. Afterwards wind up about 100 turns short of the full number, let the model fly a short distance and adjust as required. If the model does not rise move the main plane forward; if the rise is too fast, move the main plane back. These adjustments should not be more than $\frac{1}{8}$ of an inch at a time.

"7. When finished flying, take elastic off, and keep it in the dark. Always lubricate both elastic and bearing before flying."



Anti-Aircraft Insurance for Small Properties.

IN the House of Commons on Wednesday Mr. Herbert Samuel, Postmaster-General, announced that with the concurrence of the Board of Trade a scheme had been framed by the two departments, which would enable members of the working classes to effect, through the Post Office, insurances on properties of comparatively small value against air raids and other risks.

Any member of the public will be able to apply at the counter of any post office for a certificate of insurance, and on filling in his name and address on the certificate and counterfoil and paying a sum of 6d. his property will be insured by the Government to the amount of £25, for a period of 12 months, against destruction or damage directly or indirectly caused by attacks by aircraft, or by shells used against aircraft, or by bombardment from the sea. A payment of 1s. will effect an insurance of £50, and of 1s. 6d. an insurance of £75, which is the maximum amount. Insurances for £100 and over can be effected under the previous Government War Risks Insurance Scheme. The Post Office insurance is not intended for property worth more than £100, nor does it apply to buildings, nor to loss of life or bodily injury. In the event of damage covered by the insurance, claims may be made through any post office and will be dealt with by the Government War Risks Insurance Office.

In an explanatory pamphlet it is stated that the property insurable includes furniture, clothing, household goods, tools, and personal effects; stock, fixture fittings, and utensils of trade.

The amount paid will be limited to the actual amount of damage done, and even if several certificates have been taken out on the same property not more than £75 in all will be paid. If the loss is covered by other insurance the first claim must be paid upon them, and no payment will be made by the Government unless the amount paid by the other insurers is insufficient to meet the amount of the damage done. The useful average clause will prevail, that is to say, if £30 damage is done to property insured for £75 and worth £60, £75, £80, or £100, the full loss will be paid. If the property were worth £150 only two-thirds of the damage (£20) will be paid.

Firing on Zeppelins.

QUESTIONED in the House of Commons on the 3rd inst., Mr. Tennant said it was not the case that orders to open fire can only be given by a field officer. Any officer may order the troops to fire.

The Lights of London.

REPLYING to a question in the House of Commons on Tuesday, Sir J. Simon, Home Secretary, stated that the lighting of London was regulated in accordance with advice given by those responsible for the defence of London from air raids, and while full consideration was given to the desirability of maintaining reasonable lighting he could not disregard the advice under which he was acting. The matter was receiving close attention, and if any relaxation was found practicable it would be given effect to without delay.

Anti-Aircraft Defences.

MR. LYNCH on Tuesday addressed a question to the First Lord of the Admiralty as to whether efficient range-finders for Zeppelins had been provided in London for the use of the anti-aircraft service.

Dr. Macnamara replied that it would not be in the public interest to publish details of the defences of London against aircraft.

Mr. Lynch: Does not the right hon. gentleman's inability to reply to the question really mask grave incompetence on the part of this Department?

Dr. Macnamara: No, the answer means what it says.

New Works for Emaillite.

As will be seen from an announcement elsewhere in this issue, the British Emaillite Co., Ltd., are now in talled in their new works at 5, Hythe Road, Cumberland Park, Willesden Junction, N.W. Already the productive capacity of the new plant has been fully tested, and it is gratifying to hear that the demand for Emaillite, still continuing on the up-grade, has necessitated the laying down of numerous new machines.

An Industrial Opening.

IN our advertisement columns this week appears an announcement on page xi inviting enquiries in regard to taking up the construction of a new British warplane. It should afford a unique opportunity for any capitalist who is desirous of entering the aeronautical industry with a tried article ready for exploitation to his hand, and it is for this reason that we draw attention to the matter.



IMPORTS AND EXPORTS, 1914-1915.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; and for 1914, see "FLIGHT" for January 15th, 1915:—

	Imports.		Exports.		Re-Exportation.	
	1914.	1915.	1914.	1915.	1914.	1915.
January ...	5,945	20,382	210	435	879	13,706
February ...	28,132	380	106	138	441	18,823
March ...	27,731	280	1,934	7,218	1,440	5,090
April ...	11,384	2,189	1,175	23,986	1,473	275
May ...	17,062	178	4,059	12,530	9,484	8,250
June ...	15,967	5,469	5,082	3,730	142	2,400
July ...	15,548	1,240	4,994	13,372	1,695	—
August ...	52,448	664	630	36,276	910	247
September ...	4,859	536	—	4,908	—	—
October ...	39,287	1,344	325	17,702	—	—
	218,363	32,662	18,515	120,295	16,464	48,791



NEW COMPANY REGISTERED.

Army and Navy Manufacturing Aircraft, Ltd.—Capital £100, in £1 shares. Objects, to manufacture and deal in aerial conveyances and aircraft of all kinds and the component parts thereof, &c.



Aeronautical Patents Published.

Applied for in 1914.

Published November 11th, 1915.

19,898. E. FORLANINI. Motor-driven airships.
21,602. W. M. JAMES. Aeroplanes.

FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.
Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

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